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Front — Short-tailed weasel. Photo by Lowell Washburn. **Back** — Photo by J.L. Schwarz.

RON JOHNSON

Special Places

IOWA'S OPEN SPACES

by Linda Wiley

WHAT ARE OPEN SPACES, ANYWAY? THIS IS THE QUESTION WE ASKED ourselves when the legislature directed the Department of Natural Resources to write an Open Spaces Plan. This is a more difficult question than it would first appear since each person's image of an open space is somewhat different, but it is important because in order to plan something, we must know what it is as well as what it is not.

Picture a favorite open space of yours. Did a park or forest image form in your mind as an open space that you like to spend time in? How about lakes, streams or marshes? These are examples of natural resources that often come to mind when we think of open spaces, but what about our urban open spaces? Our city parks, central squares and riverfront areas play an important role as gathering places for people in our towns and cities. Other aspects of cultural resources include examples of our heritage such as historical and archaeological sites.

Therefore, open spaces can include both natural and cultural resources. Let's sum up the idea of open spaces in this way: areas that are relatively undeveloped and contain natural and cultural resources having recreation, fish, wildlife, historic, scenic and educational values. It cannot be just any "relatively undeveloped" area. It needs to have a number of these values associated with it before it becomes an attractive open space in terms of our definition. Open spaces include both urban and rural settings, but exclude agricultural land and highly developed urban areas.

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Why should we protect these places? We have said that they are attractive, but to whom and why? There are a number of answers to the second part of this question. Perhaps the answer to the first part of the question will become a little clearer if we use a favorite example of Gerry Schnepf, Executive Director of the Iowa Natural Heritage Foundation. Think back to your childhood. Are there any special places that you used to go to that aren't there anymore? One person faced with this question remembered a shady spot next to a creek that has since become a shopping mall. Another remembered a pine stand on his grandfather's farm where he used to play games. Those pines were the first things to go when the farm was sold to a developer for a rural subdivision. Roads now follow the hills where he used to sled. The answer then is that open spaces are valuable to all of us; and one reason could be so that we, our children, grandchildren, even our great-grandchildren, will have special places to return to.

Open spaces enhance our quality of life. Think of what Manhattan would be like without Central Park. This open space was created by people who foresaw at least to some extent the need for warm, natural places in the urban environment. It seems unlikely to us that Des Moines will ever become *that* urbanized, but think back — how many skyscrapers were in the Des Moines skyline just 20 years ago?

Iowans need a place to go to refresh and revitalize their spirits. Hopefully, we won't be forced to travel longer and longer distances to do it. Many Iowans already travel outside the state on their vacations or on weekends. They seem to feel that the Iowa landscape has little to offer. Perhaps it is true that the rolling hills of Iowa aren't nearly as spectacular as the Rockies. Or that Iowa does not have quite the impact of mile after mile of sandy shoreline. But what Iowa does have is different. Its subtlety is akin to a fine wine — it takes some time to acquire a taste for it, but once you do, the appreciation just keeps growing.

Similarly, hundreds of thousands of tourists traveling to the four points of the compass too often view Iowa as one massive cropfield that lies between them and their destination. We know Iowa is far more than that, but we must also become aware that

ribbons of trees along our river and stream valleys, remnants of prairie and other attractive natural areas are vitally important aspects of our countryside. These areas are the frame for Iowa's picture of productivity.

There are also more reasons for protecting our open spaces — they help keep our natural systems functioning properly. Nature is a complex combination of interactions. Our marshlands, for instance, serve as filtering and flood-control mechanisms (as well as habitat for waterfowl). Perhaps restoring some of the marshlands that have been tiled and drained would help control our growing groundwater contamination problem. Our wooded hillsides help keep the fertile topsoil from blowing or washing away. Too much of the soil that took hundreds of years to form ends up in places where it isn't wanted — in ditches, streams and lakes.

The diversity of nature is important to protect. For example, the genetic diversity of wild corn was used to develop our high-yield, disease-resistant hybrids. Since these hybrids cannot reproduce themselves, we must keep a supply of parent seeds in order to produce the genetically identical hybrid seeds. If a new disease evolves or is imported, genetically different parents would be needed to develop new hybrids to resist that disease. The consequences of not having a diversity of parent seeds to draw on could mean the extinction of corn as we know it.

Digitalis (for the heart) and quinine (for malaria) are both medicines that came from nature. The key to a cure to cancer may be held by some yet-to-be-discovered plant or animal. If the plant or animal disappears because it no longer has a suitable habitat, we could be out of luck. The survival of these suitable habitats depends, in part, on diversity. Striving to keep the diversity of our open spaces is also important so we don't end up like a town that only planted elm trees. What was once a pleasant shady community had almost no shade left after the Dutch elm disease came through.

Protecting our valuable open spaces will also provide examples of our heritage — both natural and cultural. When our children ask what Iowa used to be like, we can take them to a prairie and show them the rippling waves of tall grass. They can see for themselves the seasonal flower show of the well-established prairie instead of trying to picture it from words in a book. We can show them Indian burial mounds and arrowheads. We can visit Iowa's first capitol and get a sense of what it might have been like to govern a new state.

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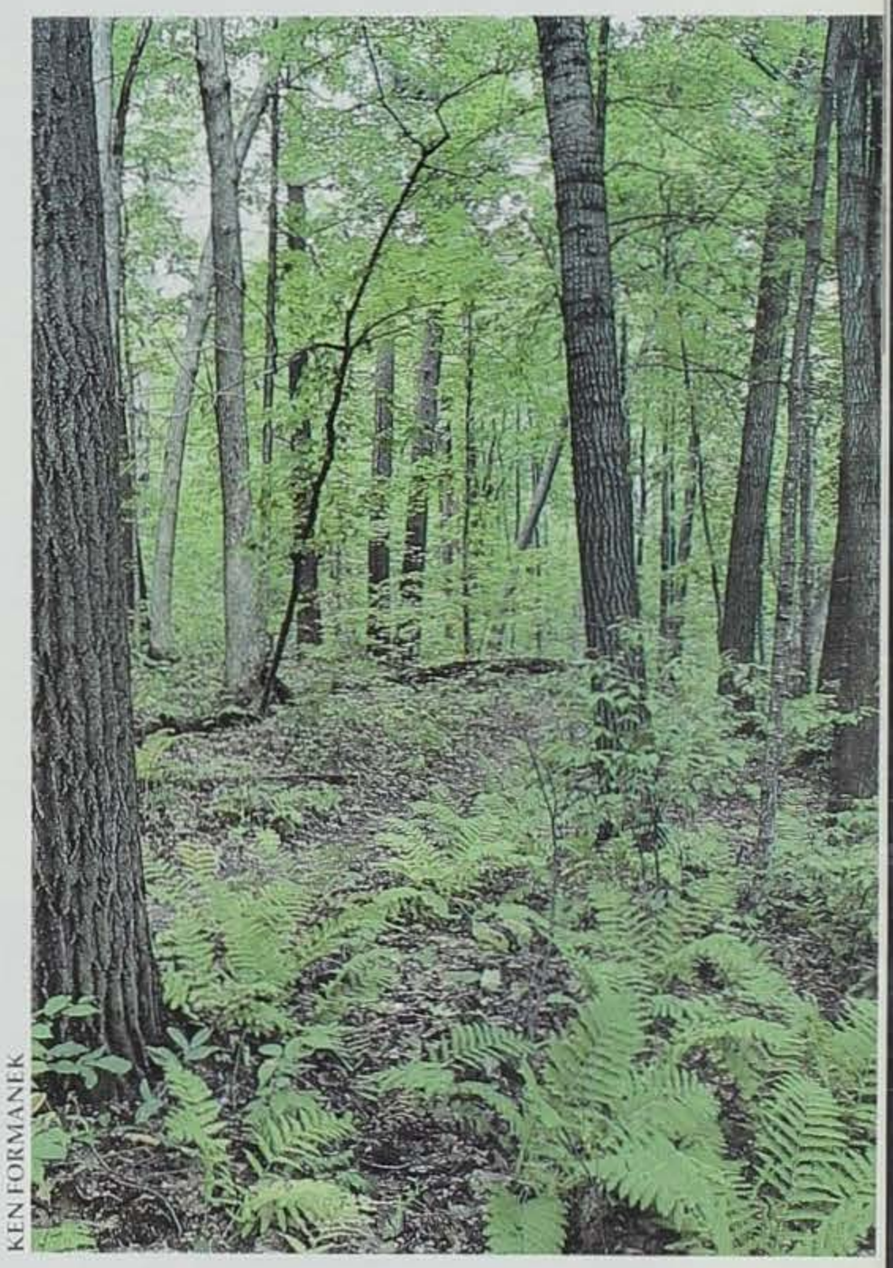
Knowing *what* to protect is the first step in protection. We must identify our valuable natural and cultural resources and some ways to protect them. A plan will give us goals to work toward and a set of priorities — not just which resources need protection, but an order of need. Without the plan, we might proceed buying bits and pieces of land in an aimless patchwork.

The second step is implementation of the plan — actually working to protect the areas identified in the Open Spaces Plan. This is far more difficult and costly than writing a plan. The plan will take months to write, but it will take years to implement. Without encouragement and support, it may not be implemented at all; and many of our valuable resources — our special places — will continue to disappear.



KEN FORMANEK

Linda Wiley is a student at Iowa State University majoring in landscape architecture.

HOUSEHOLD HAZARDOUS WASTES

by Ruth Bender

Most of us think hazardous wastes are business and industry's problem. But many common household products have the same ingredients found in industrial hazardous waste. Household hazardous waste collection programs around the nation have attracted DDT, PCBs, cyanide, lead, strychnine and explosives — evidence that households are currently storing extremely hazardous materials. These products must be used, stored and disposed of safely in order to protect public health and the environment.

What are household hazardous materials?

In Iowa, household hazardous materials include such products as:

- motor oil, motor oil additives and filters
- gasoline and diesel fuel additives
- degreasers
- waxes and polishes
- solvents
- paints, excluding latex paints
- lacquers
- thinners
- petroleum-based spot and stain removers
- petroleum-based fertilizers

Specifically excluded from the legal definition of household hazardous materials are laundry detergents or soaps, dishwashing compounds, chlorine bleach and personal care products.

As a practical guide, product labels can help identify most products that are hazardous. Key words such as flammable, corrosive, caustic, toxic, explosive, reactive and poisonous are all general indicators of hazardous materials.

Why should I worry about household hazardous materials?

Household hazardous products are considered safe when used according to label instructions. They become household hazardous wastes when a portion of the product is left over and discarded. Problems can result when hazardous products are disposed of in the trash, in the backyard or down a drain.

When tossed out with the trash, household hazardous waste can cause explosions that damage equipment. Waste handlers have suffered from chemical burns, inhalation and unknown chemical contact. Eventually, household hazardous wastes end up in sanitary landfills. The waste material can escape from its container and mingle with water filtering through the other wastes in the landfill. The contaminated water, called leachate, can migrate to ground and surface waters and render them unsafe for drinking water. When poured down a drain, household hazardous wastes can damage septic tank operation or pass through wastewater treatment facilities undetected. Disposal of household hazardous waste into storm drains or on the ground can result in direct discharge into surface and groundwater.

What state programs address the household hazardous waste problem?

In 1987, the Groundwater Protection Act was enacted. A household hazardous waste program was established to address the growing use and disposal needs of hazardous materials used in the home. The goal of the program is to reduce the hazards from improper disposal of household hazardous materials by reducing waste, encouraging the use of less toxic alternatives and developing sound disposal options. The program will be implemented in the following ways.

- Iowa retailers who sell household hazardous materials will help consumers identify hazardous materials by displaying a uniform label by household hazardous products.

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Retailers will also make available brochures that contain information on the proper use and disposal of household hazardous materials.

- The Department of Natural Resources, in addition to coordinating the program at the retail level, will promote and sponsor Toxic Cleanup Days to collect and dispose of wastes from both rural and urban households. The DNR will also provide public information and education on household hazardous materials, their proper disposal and nonhazardous alternatives to household hazardous products.

- The Department of Transportation will conduct a pilot project for waste oil collection.

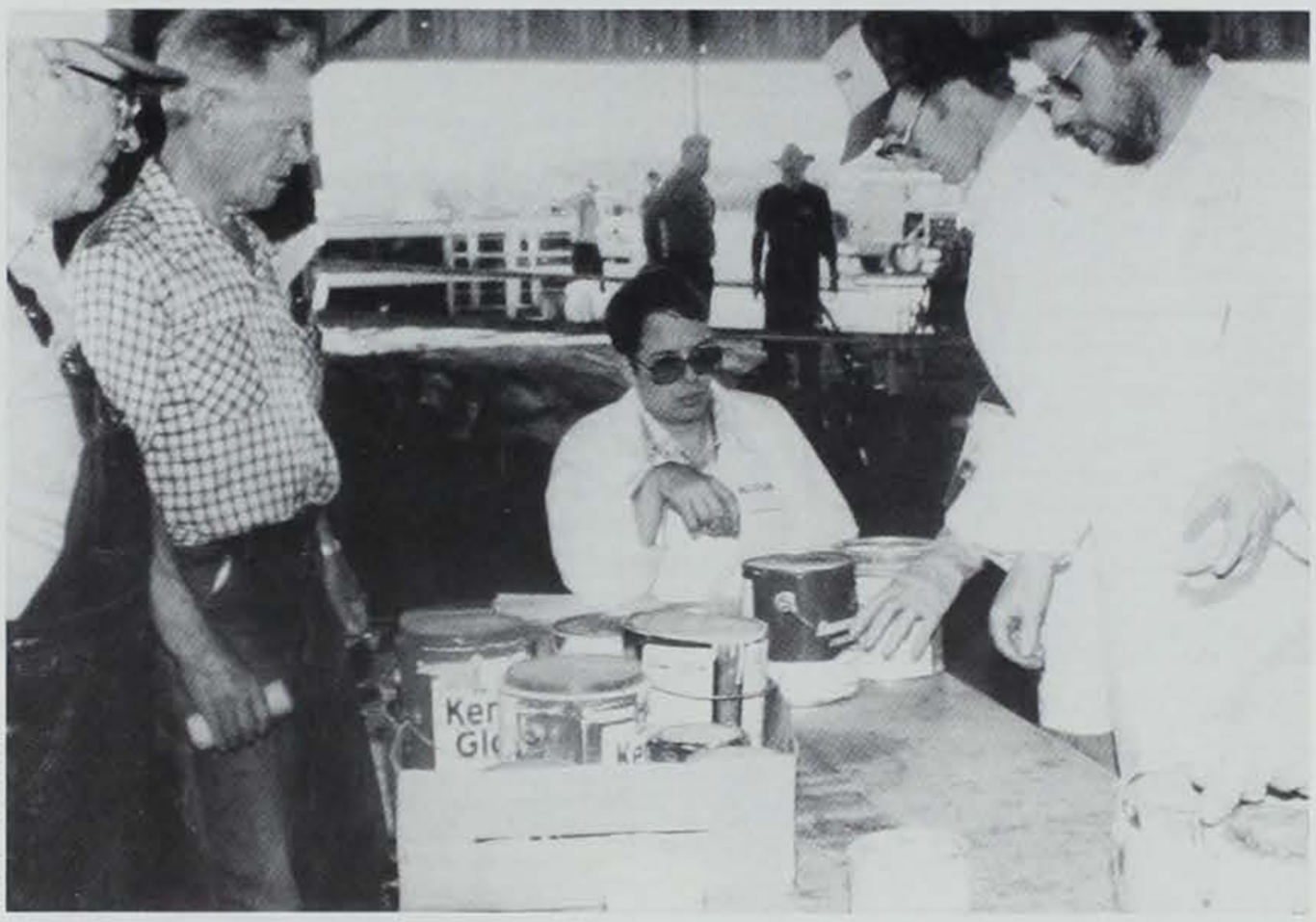
- All retailers who sell household hazardous materials are required to have a permit. The receipts from the permit fee are deposited in the Household Hazardous Waste Account and are used to support the household hazardous waste program.

Other provisions in the Groundwater Protection Act address the safe disposal of hazardous waste and could be used to help address the problems of household hazardous materials. Grants are provided for planning and demonstration projects to develop alternatives to landfilling solid wastes. A Small Business Administration Center for the safe and economic management of solid and hazardous substances has been established at the University of Northern Iowa.

What can I do now to limit the amount of household hazardous waste that I generate?

The following list offers some general guidelines:

- Buy only what you need.
- Look for nonhazardous alternatives.
- Use according to label instructions.
- Keep product in its original container.
- Store in a safe place.
- Use it up or give unused portion in its original container to a friend to use up.
- Find a recycling outlet.
- Call the Department of Natural Resources' Groundwater Hotline number (1-800-532-1114) for specific disposal instructions and advice.
- Store in a safe place until an appropriate disposal method becomes available.



WENDY ZOHRER

Toxic Cleanup Days were held at Cedar Rapids and Dubuque in 1986 to collect and properly dispose of household hazardous materials. The DNR is hoping to continue with Toxic Cleanup Days in other major cities throughout the state.

Ruth Bender is the administrator for the Waste Management Authority Division.

Lorenzen has made his farmstead virtually energy self-sufficient.

John Lorenzen
A Man Ahead of His Time

Text and Photos by
Wendy Zohrer

The winds that blow across the Iowa landscape have been harnessed for more than 65 years by John Lorenzen, a farmer and inventor. His wind generators have cranked out enough electricity to power his entire central Iowa farmstead near Woodward in Dallas County. He generates power for everything from the tools in his shop to the typical kitchen appliances. And all of this has been done without a single penny going to the utility company.

Lorenzen has now expanded his energy focus to include other projects such as solar and hydrogen power. His family car and pickup truck can now operate on hydrogen which has been generated from the electrical current of his wind generator. This is only one of many projects dealing with the use of hydrogen power.

His early innovative ideas were not energy projects, but dealt with farm machinery. At the age of 15, he began tinkering around with farming implements. His inventions have helped to make farming a little easier as well as more comfortable, even in the middle of winter. He constructed a heated cab for his tractor long before any tractor companies manufactured them. He also devised a self-propelled wagon in 1939. This saved time during the harvest. His team of horses could remain harnessed to the field equipment while he hauled the grain from the field. Lorenzen grinned and commented, "My wagon can go 30 mph when it is empty."

Lorenzen has retired from farming, but he continues with his improvements for farm-related implements. He is currently working on changes for his garden tractor, — it may be added shortly to his long list of other farm machinery improvements. They include a barbed-wire winder and unwinder, post puller, rock digger and post-hole digger. Lorenzen explained that he can dig 80 rods of post holes in two hours.

Lorenzen's father was the first to spark his interest in wind power, but it wasn't until 1925 that he purchased his first 850-watt wind machine. By 1935 and with a $75 investment, a

2,500-watt Jacobs wind generator was added. Today, two wind generators tower over his farm buildings.

The power generated by these windmill-like machines is stored in batteries salvaged from trains, industrial equipment and even submarines. Some batteries are at least 80 years old, but they still provide reliable power storage. Seven interconnected battery sets of 24 fill the battery room in his shop, and a main powerline connects it to all other buildings.

One wind charger operates almost continuously while a second primary unit assists during periods of low wind speed. August is usually the worst; therefore, Lorenzen built a standby generator with a 200-amp output for more backup power capacity.

Since 1975, his farm shop has also been equipped with solar panels and a heat storage system. This efficient heating method has allowed him to work in his shop even under the harshest weather conditions. It may be 20 degrees below zero, but his shop will remain near 70 degrees Fahrenheit.

Several solar collectors are mounted on the south wall, and the south slope of the shop's roof. The four collector plates on the exterior shop wall are made from sheets of aluminum that Lorenzen crimped and painted black.

None of Lorenzen's inventions have been patented, but scientists from all over the world have visited his farm. Companies in Japan, Canada and the U.S. have patented some of his ideas. One memorable event occurred when a plane load of scientists landed their small aircraft on the gravel road near his farm, parked it in his front yard, and toured his farm facilities.

John Lorenzen's humor, energy and enthusiasm hasn't noticeably changed over all these years. He plans to continue his work on solar and wind power, and he never becomes discouraged when something does not work. He simply tears it apart and begins again.

Wendy Zohrer is an information specialist located at Des Moines.

Materials for all of the solar units were purchased second-hand or salvaged from scrap piles. Lorenzen designed and built the solar panels himself.

Interconnected Edison batteries are used for power storage.

Small-Game Hunting In Iowa

The Last 25 Years

DNR PHOTO

by Jim Kienzler

IT'S THE BEGINNING OF FEBRUARY AND THE SNOW'S FLYING IN IOWA. AS YOU browse through your mail, you notice a large, colored postcard. It is something called the 1987 Small Game Hunting Questionnaire. It begins:

Dear Iowa Hunter:
The Iowa Department of Natural Resources is again making its annual survey of small game hunters in Iowa. You are one of a randomly selected . . .

Being a conscientious person, you complete the survey and send it back. Now you're wondering, what do they do with those surveys? The Department of Natural Resources estimates trends about small-game hunting in Iowa. The number of small-game animals taken by hunters, the number of resident and nonresident hunters actually hunting, and the number of trips taken are some of the types of information determined annually. The following is some of what we have learned about small-game harvest, hunting and hunters in Iowa since about 1963.

License Sales

License sales for resident hunters, those buying resident or combination licenses, averaged around 300,000 for the period 1963-78. During 1982 through 1986, there has been a general decline in licenses sold. Lower pheasant populations, Iowa's declining human population, and the poor economy in general during this period are factors that caused this decrease. In 1980 and 1981, the expectation of reasonably good upland game populations was sufficient to maintain hunters. "Upland game" populations in Iowa refers primarily to pheasants since most hunters hunt pheasants. Significant declines in license sales occurred in 1965, 1972 and 1979. In 1965, the decline was due principally to fewer people buying regular hunting permits, not combination hunting and fishing permits, in a year following a harsh winter with lower predictions for fall pheasant numbers. In 1972, pheasant counts were similar to 1971, but the price of licenses increased. This usually results in fewer licenses being sold. The dip in 1979 was caused by several factors: the winter of 1978-79 was severe, causing lower expectations of bird numbers, the crop harvest was delayed due to wet weather, and the cost of a license increased.

Nonresident hunter numbers increased gradually until the mid-1970s when license sales plateaued. Since then, they have slowly decreased until 1986, when numbers rebounded. Nonresident license sales are primarily a reflection of nonresident expectation of pheasant populations (about 95 percent of nonresidents hunt pheasants). The license cost is less important to them since other costs of hunting trips overshadow license cost.

Federal duck stamp sales peaked in Iowa in 1971 at over 68,000. Through the 1970s, stamp sales were between 50,000 and 60,000. In the early 1980s, sales started declining and are now about half the 1971 peak. Fewer ducks, more restrictive regulations, and a reduction of wetland acres to hunt are primary factors in this decline. State duck stamp sales have paralleled federal stamp sales since 1972 when state stamps were first sold.

Harvest

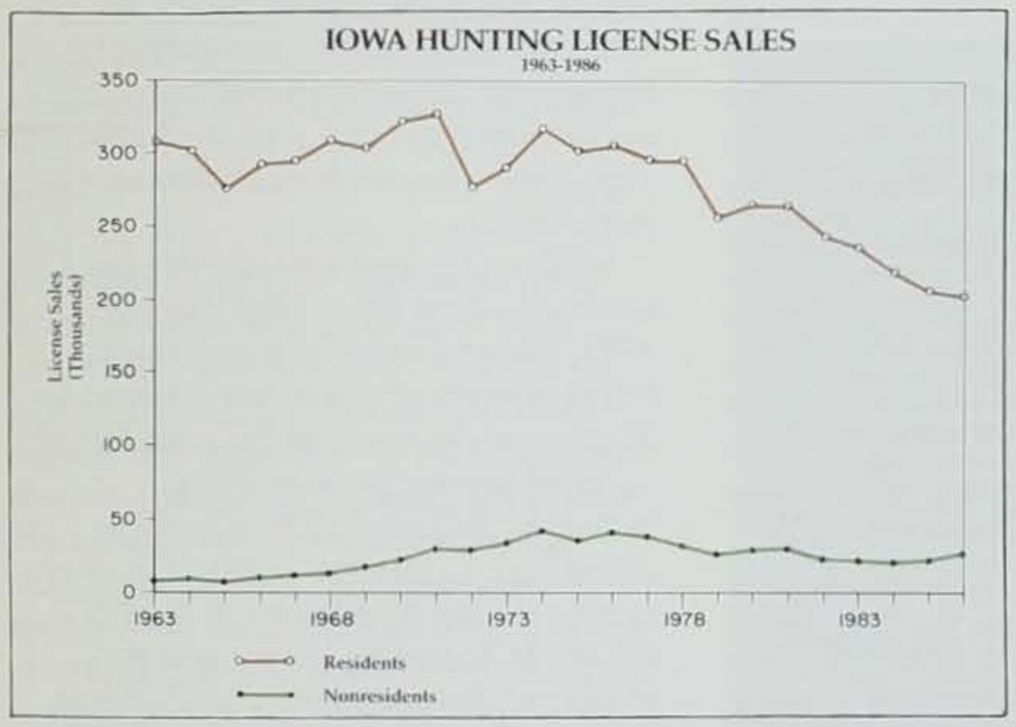
After a peak pheasant harvest of nearly two million roosters in 1963, a decline to about 1.1 million birds by 1965 resulted because the previous harsh winter caused fewer birds, and fewer hunters pursued those birds. Harvest rebounded gradually until 1972 when a drop in license sales resulted in fewer hunters and fewer birds killed. August pheasant counts declined that year in eastern Iowa, but remained about the same in the rest of the state. Adequate habitat was still present in northern Iowa. After a brief rebound in 1973, pheasant harvest has generally declined since then as habitat deteriorated everywhere except southern Iowa. Hopefully, the estimated 725,000 roosters taken in 1984 will always remain Iowa's record low pheasant harvest. That year produced the worst August pheasant count since the beginning of our present counting system in 1963.

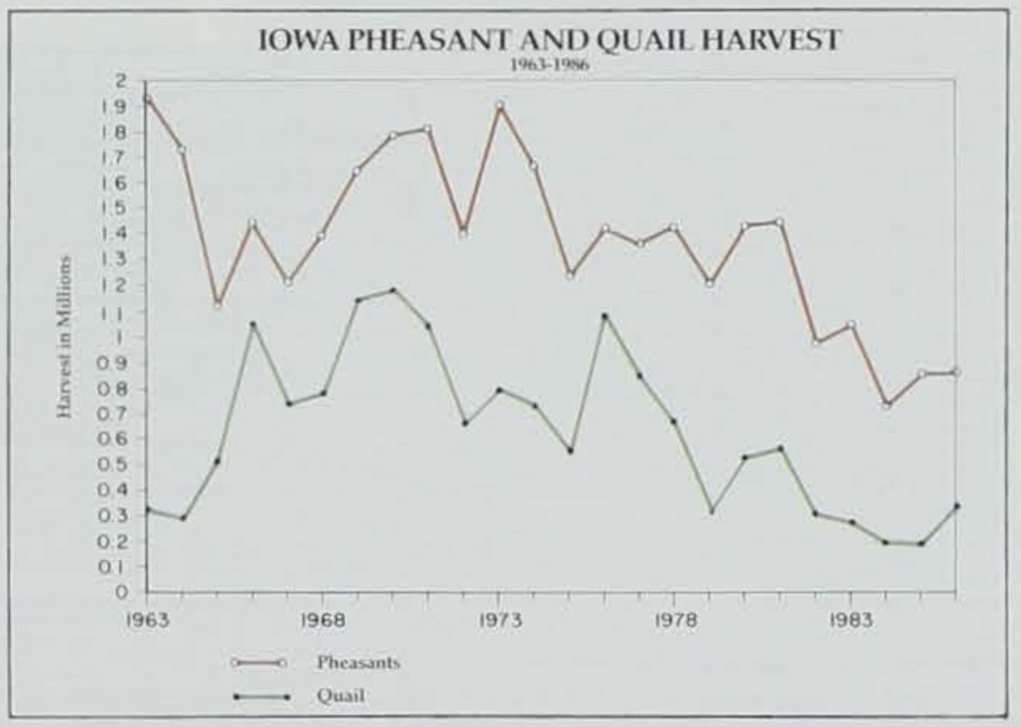
Generally, quail harvest estimates have paralleled those of pheasants. Southern Iowa winters are more important to quail than northern Iowa winters because quail are found

DNR PHOTO

predominantly in southern Iowa. Since good populations of both species are presently found in southern Iowa, and most hunters pursue both kinds of birds simultaneously, the number of pheasant hunters has more influence on quail harvest now than in the 1960s. Quail populations are more susceptible to harsh winters than pheasants, so we expect quail harvests to be more erratic than pheasant harvests. Hopefully, the low harvests of 1984 and 1985 will remain only bad memories never to be duplicated. Again, 1984 was the worst year of recorded quail counts in Iowa. Fortunately, quail have a tremendous capacity to rebound, as demonstrated by the almost 80 percent increase in kill in 1981 after the then 1979 historical low. Quail roadside counts quadrupled in that two-year period. We estimate about a quarter of resident hunters pursue quail. In years with good quail numbers, that proportion jumps to about a third.

Hungarian (gray) partridge harvests have increased dramatically since the estimated 8,000 harvested in 1963. Both Hun populations and distribution have also increased. Hun harvest has neared 100,000 in 1978 and 1982 and dropped to as low as 33,000 in 1984. Harvest in the 60,000 bird range has been common the last 10 years. Partridge are frequently taken incidentally while pheasant hunting. Since Huns have been predominantly a northern Iowa bird, the decline of pheasant hunting in that region has been partially softened by increased Hun populations. However, the decrease in pheasant hunters has depressed the partridge kill that could have occurred. No doubt some would argue that the near migratory flights of flushed Huns reduces harvest as well. Usually about 10 percent of Iowa's small-game hunters hunt Huns.





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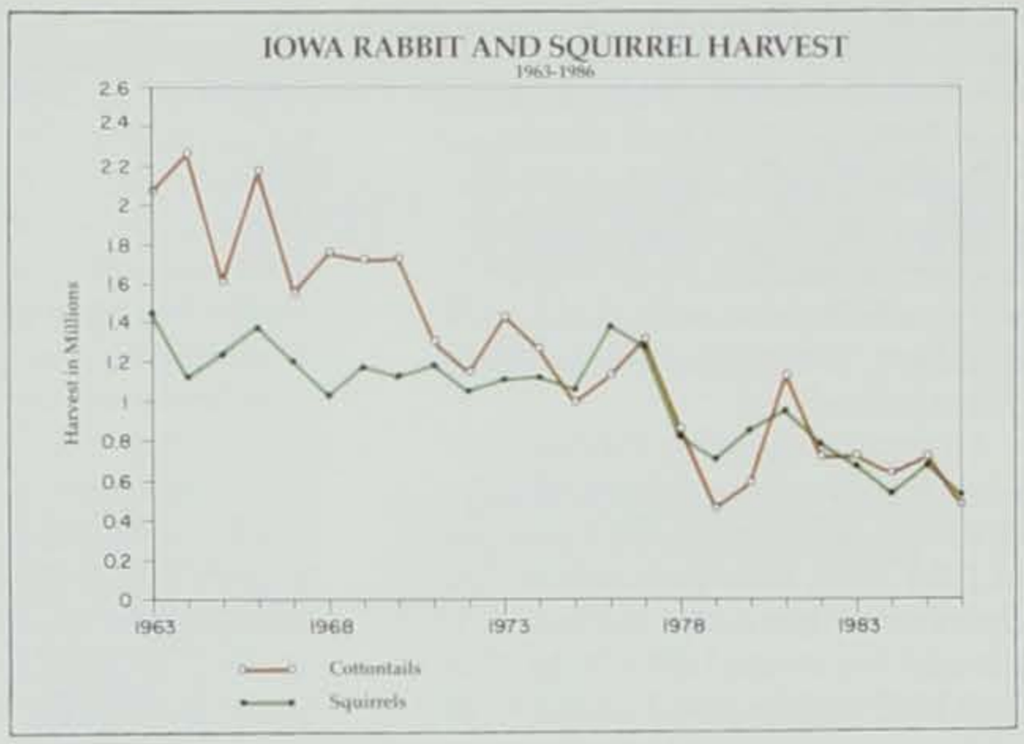


ROGER HILL

Cottontail rabbit harvests have generally decreased in a somewhat erratic fashion in the last 25 years. Rabbit hunter numbers have decreased substantially in that same period — about half the license buyers indicated they hunt cottontails. The most pronounced decrease occurred in the late 1970s. Fewer than 100,000 licensees went rabbit hunting in 1986, indicating there is simply less interest in cottontail hunting. These decreases do not appear to be accompanied by similar trends in cottontail populations because August roadside counts show rabbit numbers at or above the 25-year average in five of the last six years. In 1985 and 1986, counts in southern Iowa were the second and third highest recorded for that region of Iowa. This area is Iowa's best cottontail population.

Squirrel harvest remained relatively constant from 1963 through 1977, but an essentially downward trend is evident since then. About a 22 percent decrease in the number of squirrel hunters was recorded between 1977 and 1979. The 1986 estimated number of squirrel hunters was less than 60 percent of the 1977 estimate. In years when mast production is low, squirrel populations reduce. However, the real decline in squirrel harvest is due to fewer squirrel hunters. The percentage of licensees hunting squirrels dropped from about 48 percent after 1977 to about 40 percent, where it has stayed. Since many squirrel hunters are young, perhaps the enormous selection of other activities presently available to youths has resulted in a lower priority for squirrel hunting.

There has been a substantial decrease in the number of small-game hunting trips taken in Iowa since 1979 when an estimated 4 million trips were taken. In 1986, only 2.2 million trips were made. Obviously, fewer people buying licenses and a decreased population of some species, principally pheasants, is the main reason for the drop. On the opening day of pheasant season in 1986, I was driving on I-80 east of Des Moines. Doing a quasi-scientific survey of passing vehicles, I noted that people wearing black and gold outnumbered by almost two to

one those dressed in blaze orange. Fall weekends offer many distractions these days, and hunting must compete with them.

Of course, we all know that 90 percent of the pheasant kill occurs on opening weekend. Wrong! Generally, about a third of the harvest is taken the opening two weekends and intervening week. Usually, less than a quarter of the quail kill occurs during the same period. Several factors work together to produce variation in these statistics. Certainly late crop harvests and wet weather can have a depressing effect on the number of hunters afield on opening weekend. Obviously, low pheasant numbers have a similar effect. If hunters have a low expectation of bird numbers coupled with poor crop harvest and weather conditions, they won't even attempt to hunt. Many of these individuals probably hunt only once or twice a year and may not go at all in poor years. Ah, you say, fine; that's more pheasants for my friends and me later in the year. True. Unfortunately, the total pheasant harvest will probably remain below its potential that year since not enough hunters will go out later to compensate for the lost effort early in the season. Success is better early in the season. The average pheasant kill per trip was about 55 percent greater the opening nine days of the season than the last two weeks in 1984, for example.

About 10 to 15 percent of the quail-hunting effort occurs after the pheasant season has closed. As little as eight percent of the trips occurred after the pheasant season in years with bad January weather. The average quail kill per trip was about the same throughout the season in 1984.

Hunter Characteristics

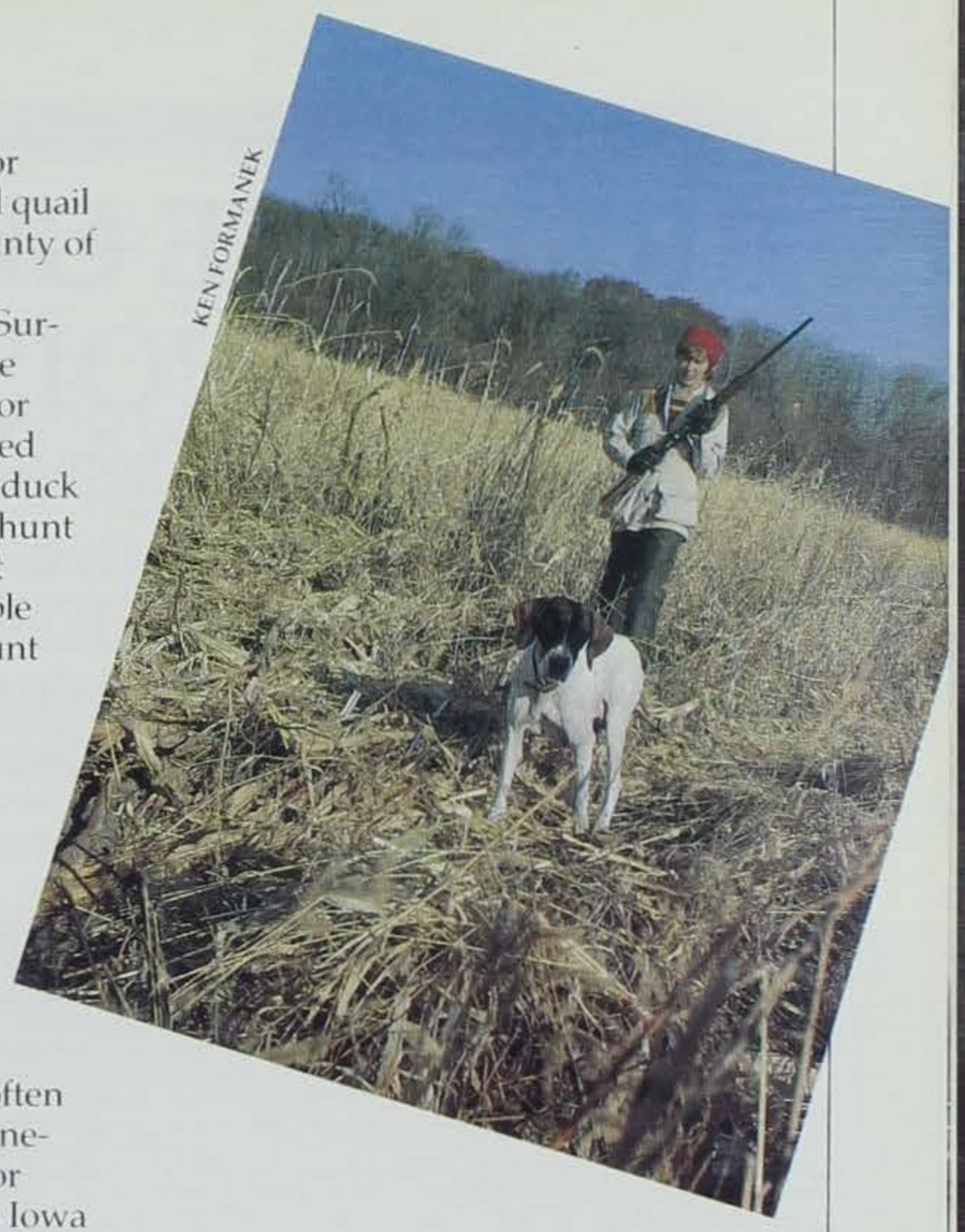
Generally, hunters most often hunt in their county of residence. In 1977, we examined mobility of resident hunters for several small-game species. Over 75 percent of the pheasant hunters hunted pheasants at home. About 15 percent hunted most often in counties adjacent to their home county and the remaining 10 percent hunted farther away for pheasants. Since quail are restricted to basically southern Iowa, it is not surprising only 66 percent hunt at home for quail. Again, 15 percent hunted quail in counties adjacent to their county of residence and about 20 percent farther than adjacent counties. Surprisingly, about 90 percent of the duck hunters listed their home or adjacent counties as those hunted most often. Many people think duck hunters drive long distances to hunt on only a few areas in Iowa, but actually, duck hunting is available locally for most hunters who hunt ducks.

About 75 percent of nonresident hunters are from adjacent states. On the average, slightly less than a third of nonresidents are from Minnesota, just under 20 percent are from Missouri, and about 10 percent each are from Illinois and Wisconsin. Nonresidents from the adjacent states also hunt most often in border counties in Iowa. Minnesota and Wisconsin residents, for example, frequent northeastern Iowa counties with respectable pheasant populations.

Between 5 and 10 percent of Iowa resident hunters indicated they also hunted outside Iowa. In recent years, this translates into approximately 20,000 hunters each year. For a comparison, over the last five years, this value averages about 70 percent of the number of nonresident licenses sold.

You may have noticed that to actually talk about 25 years of hunting in Iowa we must include 1987. The 1987 figures will have to be largely predictions since the hunting season had not started when this article was written. Although recent trends are down for many of the variables discussed in the article, we can hope that the trend has turned on harvest and number of hunters for many of our upland game species. Upland game counts are up and there seems to be renewed interest in pheasants in particular. The government set-aside program and groups like Pheasants Forever are partially responsible for the enthusiasm and a renewal of hope for better times ahead.

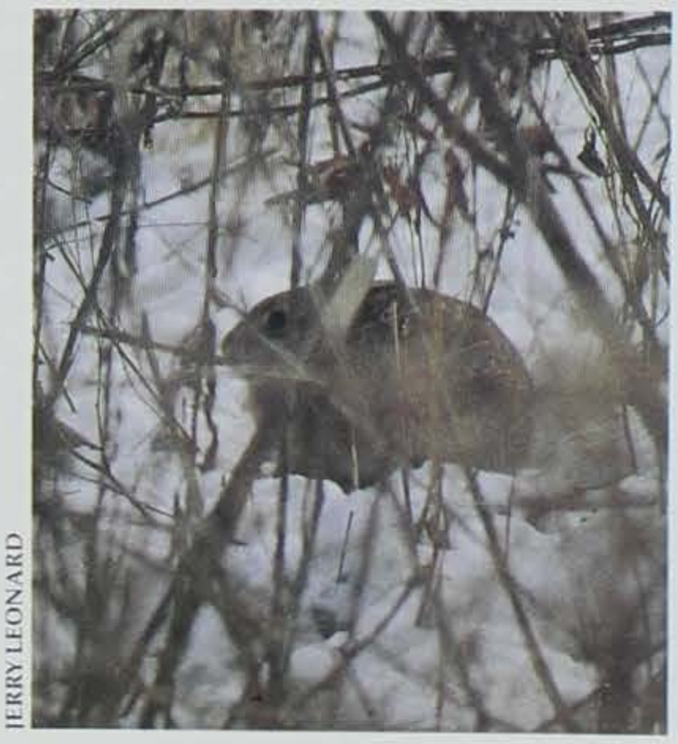
Jim Kienzler is a wildlife research biologist located at Boone.



KEN FORMANEK

BYRON DALRYMPLE

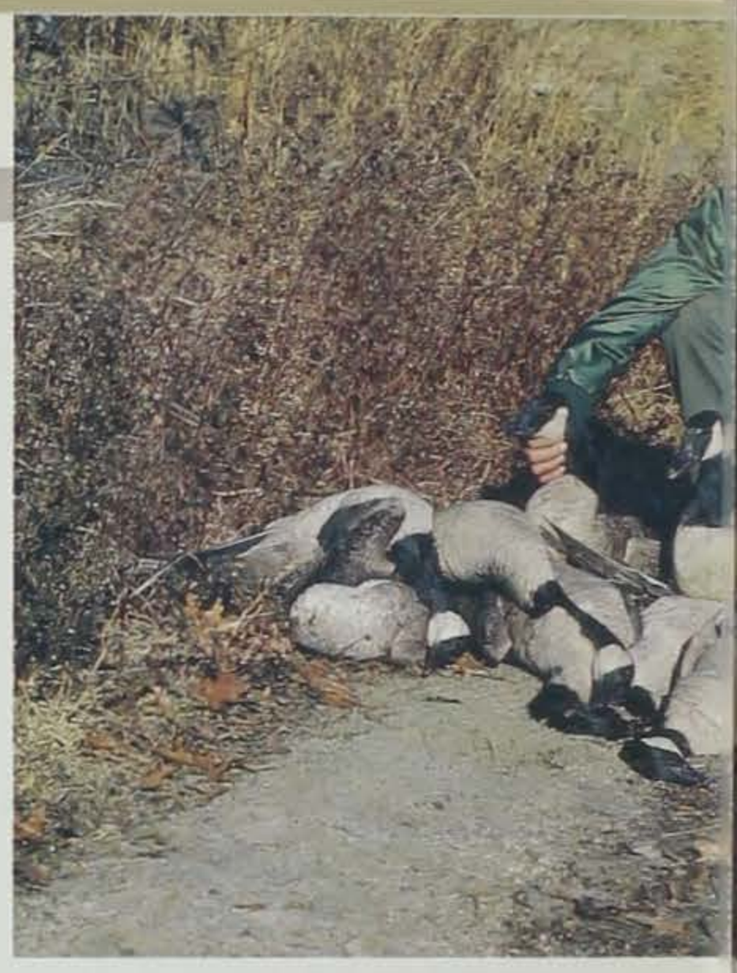
Hungarian partridge



JERRY LEONARD

RICE LAKE GEESE DIE OF LEAD POISONING

Text and Photos by Lowell Washburn



THERE ARE A LOT OF WAYS FOR A WILD GOOSE TO DIE. IN FACT, THE POSSIBILITIES are virtually limitless and range the full gamut from snapping turtles to gunners to powerline collisions. But from a purely human perspective, perhaps none are more tragically wasteful than are those losses that result from lead poisoning.

Lead poisoning occurs when waterfowl mistake spent lead shotgun pellets for seeds or grit while feeding in shallow water. Scientists estimate that at least two to three percent of the entire North American waterfowl population perishes each year from pellet ingestion. But unlike other waterfowl dilemmas (such as wetland drainage) which are profoundly complex in nature, the ultimate solution to lead poisoning is elementary and simply involves making a switch to nontoxic shooting components. Consequently, the use of nontoxic steel shot has been required for waterfowl hunting in Iowa during the past three seasons.

With this major hurtle successfully cleared, many waterfowl enthusiasts breathed a sigh of relief and assumed that the whole lead poisoning issue had now been reduced to an unpleasant memory. Unfortunately, this has not necessarily been the case. Lead is a very lethal toxin. And like most deadly substances, it can prove amazingly persistent once entered into the environment. This fact became painfully evident this last fall at northern Iowa's Rice Lake located in Winnebago County. Rice Lake serves as a focal point for one of the state's largest breeding flocks of giant Canada geese. During peak periods, the lake may hold upwards of 6,000 geese.

During late October 1987, hunters began to report seeing "sick" geese along shoreline areas. The birds appeared to display all of the classic symptoms associated with lead poisoning — drooping wings, tameness or drowsiness, and dark-green staining of the vent area. As reports became more numerous, biologists began to fear that a major problem was in the making.

In early November, DNR wildlife personnel conducted a random search of nine of Rice Lake's 35 islands. This initial effort yielded a total of 34 waterfowl carcasses and 33 sick birds. All were giant Canada geese. Scattered bones and feathers, tracks and other evidence suggested that raccoons had already keyed in on this abundant food source. Therefore, searchers were unable to determine how many geese had actually been lost. A second foray, staged a few days later, brought the known count to around 200 geese.

Although most of the goose carcasses were destroyed, a sample of the birds were dispatched to the National Wildlife Health Lab at Madison, Wisconsin. All were diagnosed as having been the victims of acute lead poisoning.

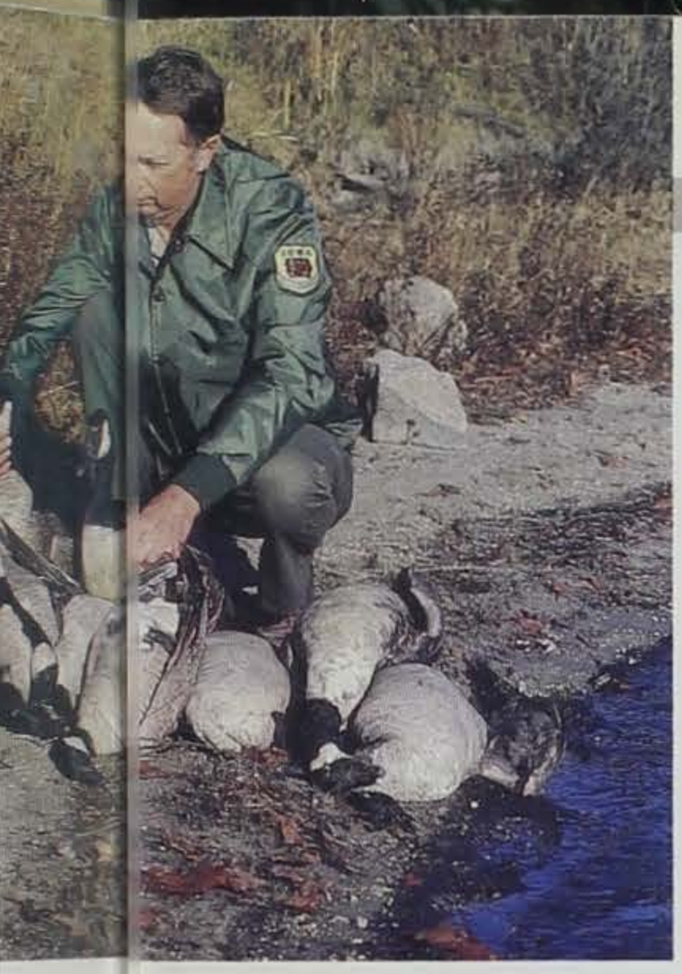
The first report forwarded from the health lab stated that the goose examined had in excess of 20 lead pellets present in the gizzard. The bird's liver tissue contained a lead level of 11.7 parts per million (ppm). Anything over 2 ppm is considered to be abnormal. Under certain conditions, only three or four lead pellets may prove fatal to a goose. One Rice Lake Canada was found to have a total of 88 lead pellets present in its gizzard!

According to state waterfowl biologist, James Hansen, the recent Rice Lake die-off was due largely to low-water levels. Prolonged drought conditions had lowered the level of the lake a full two feet below normal by early November. "This," says Hansen, "has allowed the long-necked geese to reach portions of the lakebed which were previously inaccessible."

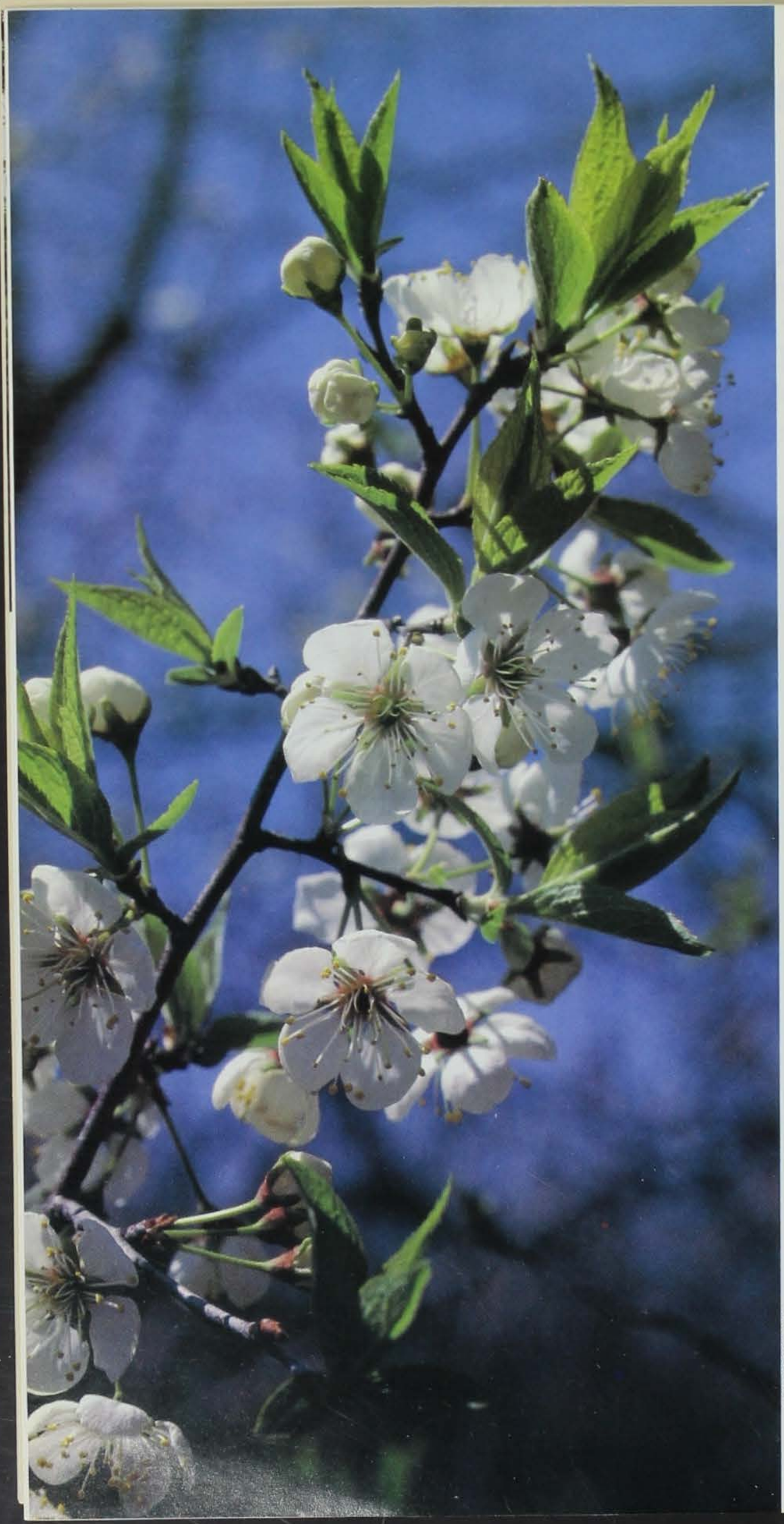
The problem was further aggravated by the fact that much of the area has a relatively firm bed which allows pellets to remain near the surface for a greater period of time. Hansen speculates that around some of Rice Lake's more popular islands there is probably an available accumulation of lead pellets that spans three or four decades of shooting.

Although skeptics may argue that migratory birds like geese may have picked up the lead somewhere beyond Iowa borders, Hansen notes that six of the dead Canadas have been banded young-of-the-year females raised at Rice Lake. "Those geese were most certainly poisoned here," he said.

Because of the efficient removal of bird carcasses by raccoons and the tendency of sick, lead-poisoned waterfowl to seek heavy cover, the full extent of the Rice Lake goose die-off will never be determined. At this point, the DNR is hoping that sufficient spring runoff will return the lake level to normal elevations and end the problem. Although such events are certainly discouraging, they may nevertheless pop up from time to time as certain conditions, such as the Rice Lake drought, develop. Because some of the geese examined did have nontoxic steel as well as lead shot present in the gizzards, Hansen speculates total losses could have been much greater if hunters had still been using lead during the past three seasons.



The toxicity and persistence of lead shot became evident in the Fall of 1987 when approximately 200 geese were found dead or dying at northern Iowa's Rice Lake. The sick birds showed all of the classic symptoms of lead poisoning — drooping wings, drowsiness and dark green staining of the vent area.



KEN FORMANEK

BLOOMIN

"The area could become a showpie of a p Plus, it could demonstrate the co mmunit — Toledo Management Propo al, 198

ON A GRAY APRIL DAY IN 1985, I DROVE TO AN APPOINTMENT IN Toledo, Iowa. Conservation officer Bob Mullen had arranged a meeting with Erney Mayo from the city's public works department to tour a park. I really wasn't quite sure what to expect from the meeting.

Once there, we drove to a corner of the 40-acre Toledo Heights City Park. This corner had been row crops for the last several years. The city now wanted a new idea on how to manage the four-acre piece that wouldn't be too expensive to implement and maintain. There was also a flood control dike which bordered the corner and part of the back perimeter of the park. It was difficult to mow the dike's steep sides, and the area behind it tended to be wet.

The river on the park's east side was beginning to meander dangerously close to the road in one spot. The erosion was being further aggravated by mowing the river bank right to the edge of the drop-off. With a lack of vegetation to hold the soil, the bank was continually eroding, eating closer to the road. Where the river curved to the east, a mature stand of bottomland timber framed the river. Many of the mature silver maple, hackberry and ash trees had cavities which could be used for dens and nests by wildlife such as wood ducks, screech owls, barred owls, woodpeckers, black-capped chickadees, chimney swifts, eastern bluebirds, squirrels and raccoons for dens and nests. The area in front of this timber was kept open by mowing. However, ruts and standing water hinted at how difficult it was to keep the area mowed.

The front of the park was bordered by Highway 30. There were no hedges or shrubs in the area; thus, no escape from the sights and sounds of vehicles continually driving past. The

MING OF A DREAM

by Laura Spess Jackson

n showpie of a park designed for recreation, education and wildlife.
ate the com unity involvement and pride which make it work."
nt Propo 1, 1985.

west side of the park was bordered by houses. With no hedges in the area, residents had no privacy in their backyards.

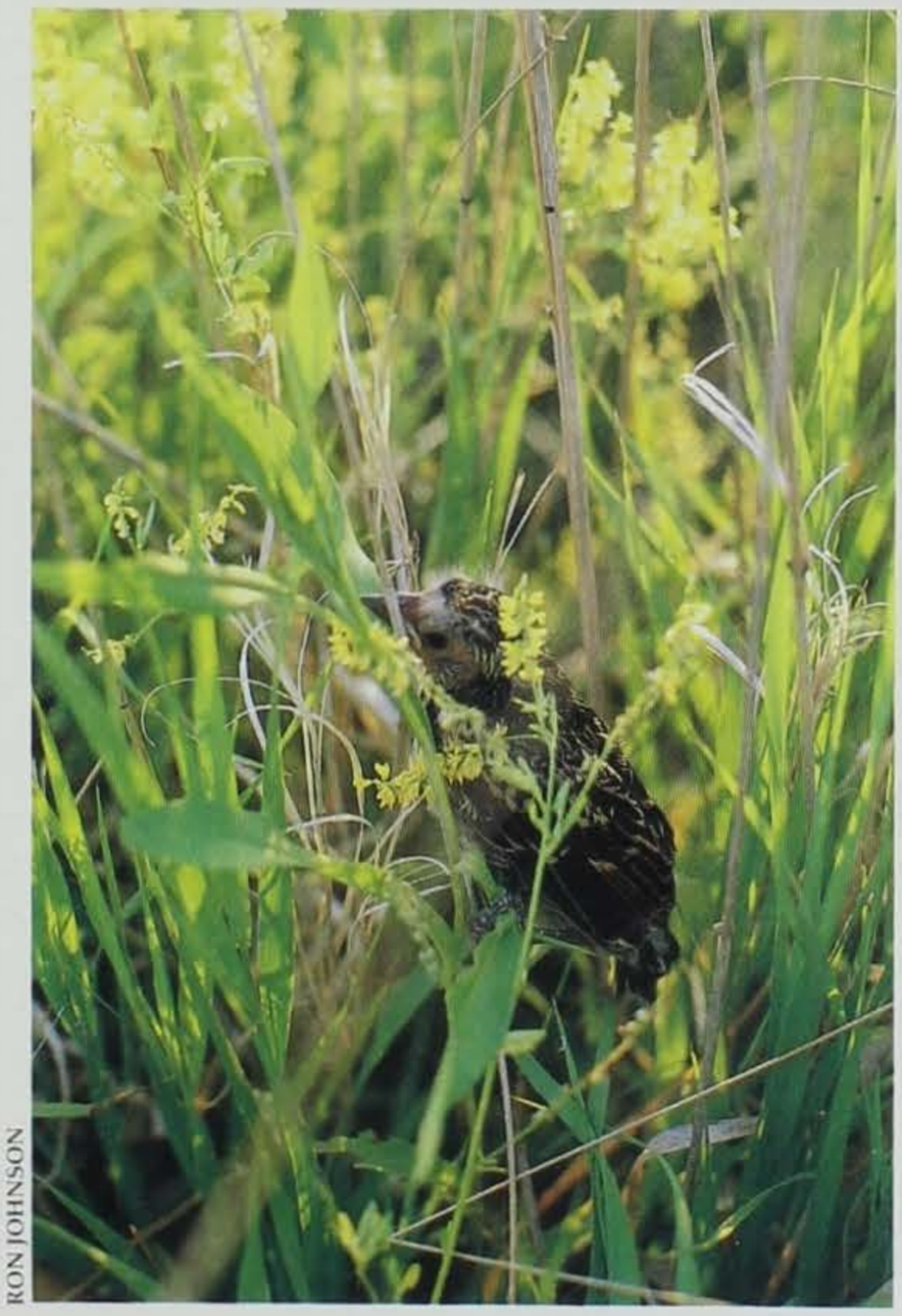
The problems were not unique to Toledo's park. Many parks (and backyards) have steep, wet, eroding or difficult-to-mow areas. Many parks and yards are plagued by noise and visual disruptions. Most parks are savannahs of mowed grass and lollipop-like shade trees. Many difficult-to-manage areas are mowed simply because we don't know what else to do with the area. However, by managing parks to just look neat and trim, we are decreasing the educational, recreational, aesthetic and wildlife value all of us could gain from these areas.

Toledo was unique in looking for new ideas. As the urban wildlife biologist for the state, my job includes working with towns and cities to blend human and wildlife interests. Toledo would serve as one of the first projects of the budding urban program.

The first step would be to develop a plan which would be approved by the city council. It would have to be economically feasible, be useful to people and provide food and cover for wildlife.

Recent statistics showed Iowans were supportive of wildlife. According to the 1985 Iowa Recreation/Tourism Survey, the five most frequently pursued recreational activities were: picnicking, driving for pleasure, fishing, swimming in a pool and hiking. I couldn't do much about the pool, but the vegetation used for wildlife food and cover could make the area more attractive for picnicking, driving and hiking plus help control the erosion which would affect fishing. Another survey by the U.S. Fish and Wildlife Service showed that 69 percent of the people in Iowa enjoyed feeding, viewing, photographing or

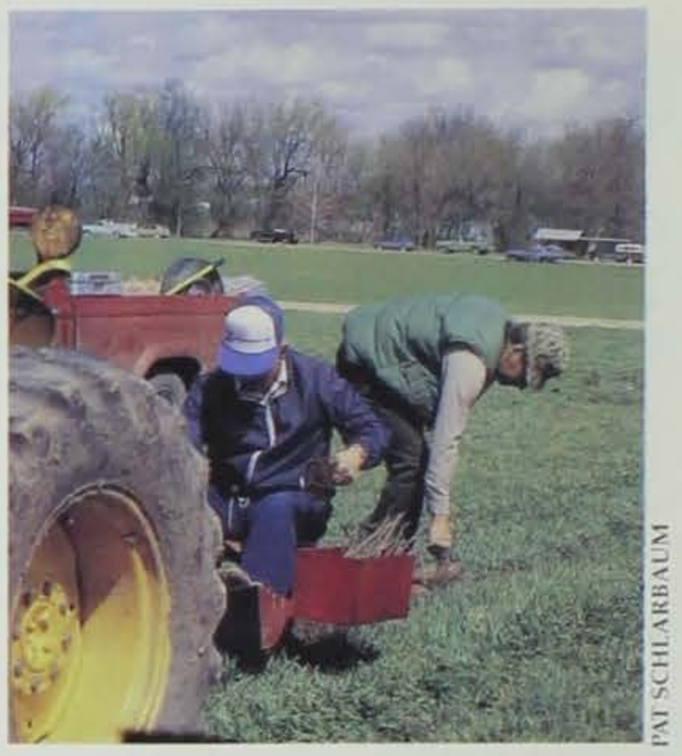
PAT SCHLARBAUM



RON JOHNSON

Plans for the Toledo Heights City Park were sent to the National Institute for Urban Wildlife in 1987. The park was certified as an urban wildlife sanctuary by the institute that same year — 15th to become certified in the U.S. and second in Iowa. Cedar Rapids' Indian Creek Nature Center is also a certified urban wildlife sanctuary. Stone State Park is currently in the process of becoming certified.

PAT SCHLARBAUM



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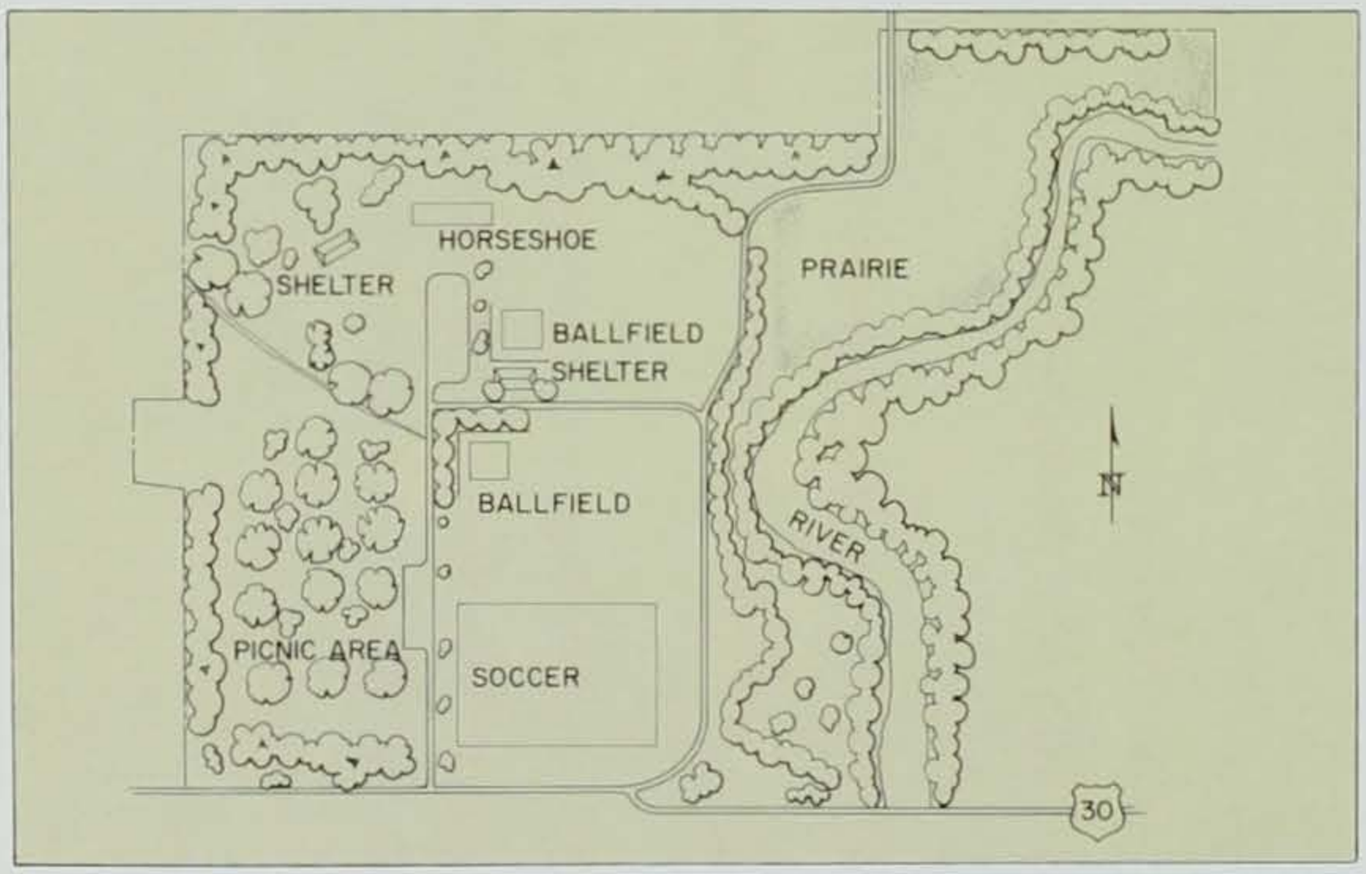


Making Toledo Heights City Park more attractive to wildlife has improved the park's recreational opportunities, helped eliminate maintenance costs and in general improved the park's appearance. The park has become an example for future urban wildlife projects and has demonstrated what community support can accomplish.

other "nonconsumptive" wildlife recreation in their own residential areas. Over 80 percent of the people enjoyed some aspect of wildlife, such as viewing birds as they were doing some other activity like walking or gardening, in their residential area.

Thus, making the park more attractive for wildlife would provide more recreational opportunity for the people. Having a variety of wildlife to view, planting a variety of plants and providing natural areas would also increase the educational value of the park. Children and adults could see and learn more about birds, mammals, botany, stream ecology, plant succession, wildlife management and other environmental principles. They could learn this in their own park.

The plans were modest. If implemented, the row crop could be converted into a prairie. It would cost about $100 an acre for grass seed. The first two years, weeds would have to be controlled. But after the third year, the area would only require mowing or burning every three to five years. Since over 99 percent of Iowa's native prairie has been destroyed, the tiny four-acre prairie would have historical and educational value as an example of the vast prairie which once covered Iowa.

The area by the river would be framed by fruit- and nut-bearing trees and shrubs. Behind this screen, natural plant succession would occur — eventually creating a small stand of timber. The timber would be a bird-watcher's and wildlife haven.

Much of the rest of the park's perimeter would be planted to shrubs and conifers. This would act as a noise buffer and visual screen in addition to providing food and cover for wildlife. It would also add spring blooms and fall color.

Without disturbing the athletic fields, playground toys or picnic shelters, the area would be more attractive to wildlife as well as people. Wet areas which were seldom used by people would not have to be mowed — saving on maintenance costs. However, the plan had to be approved.

In August 1985, the plan was approved by the city council. Since the urban program does not have money to purchase plant material, the community rallied. Money and

PAT SCHLARBAUM

volunteer labor were donated by Pioneer Seed Company, Kiwanis, Lions, Boy Scouts, Campfire Girls, Toledo Business and Professional Women, Zack's Sporting Goods Store, Asplund Tree Service, the fire department and numerous individuals. The personnel of Otter Creek Wildlife Management Area lead by wildlife biologist Bob Kurtt and Tama County Conservation Board headed by Robert Etzel added their time, expertise and equipment so that the project could go from the paper to the ground.

During Pride Week 1986, Mayor Harry Gardner officially started the planting. The prairie and 750 seedlings were planted for less than $1,000. The enthusiasm did not die in 1987. Public works director Duane Upah, Mayo, and councilmen Larry Simpson and John Kopecky were ready for step two. The prairie was burned, and 750 more seedlings and five shade trees were added.

In April 1987, the city approved designating the park as an urban wildlife sanctuary. The park plans were sent to the National Institute for Urban Wildlife in Maryland for certification. Then on September 15, 1987, Toledo's city park became the 15th certified park in the United States, and the second certified park in Iowa.

Thus, Toledo has served as an example of a park designed for wildlife and people. It has also demonstrated what community support can accomplish. However, continued support of the project can only be gained by continued education. As Mayo noted, "People have to know what they are looking at."

As Aldo Leopold said, "No important change in ethics was ever accomplished without an internal change in our intellectual emphasis, loyalties, affections and convictions." Hopefully, more cities will follow Toledo's step toward change.

The urban program is part of the Nongame Program which is funded solely by your contributions to the Fish and Wildlife Protection Fund on the state income tax form.

Laura Spess Jackson is a nongame wildlife biologist stationed at Des Moines.

HISTORY LESSONS

by Cele Burnett

As the fifth graders pour off the yellow school bus, they meet two women dressed in long pioneer dresses and bonnets. The pioneer women lead the students down a path, magically passing back through time along the way until they reach the year 1867 and the site of their pioneer day field trip.

For the rest of the day, the students will spend their time performing the daily chores of pioneer children living on Iowa's prairies 120 years ago. First, they pack their imaginary prairie schooner for the trip west from southern Pennsylvania to Iowa, taking only what they will need to live on the farmstead. They'll listen as the pioneer women talk about the long trip to their farm on the prairie.

The students learn about the development of Iowa's prairies — from the glaciers that shaped the land to the fire and winds which set the stage for the tall grasses and flowers to cover the landscape. They learn the names of switchgrass, Indian grass, and big and little bluestem. The students also feel and smell the rich, black topsoil formed over thousands of years of life and death on the prairies.

The chores begin as the fifth graders haul water from the creek, make lye soap, handwash the laundry using scrub boards, haul firewood, dig a fire pit and start the fire, cut up apples, potatoes, carrots and chicken for stew, mix and roll out noodles, and make cornbread.

There's time for a spelling bee and arithmetic lessons, as well as recess, including three-legged and sack races. After dinner (they eat what they make), it is time to pack the supplies into the "prairie schooners" and head up to Mound Cemetery on a nearby rise in the prairie.

The afternoon is spent investigating the gravestones, looking for ages and dates and familiar names. It is a somber time as the students learn that 50 percent of the people born during the early years of settlement in Story County never lived to the age of 21. Gravestone rubbings of

WAYNE MEYER

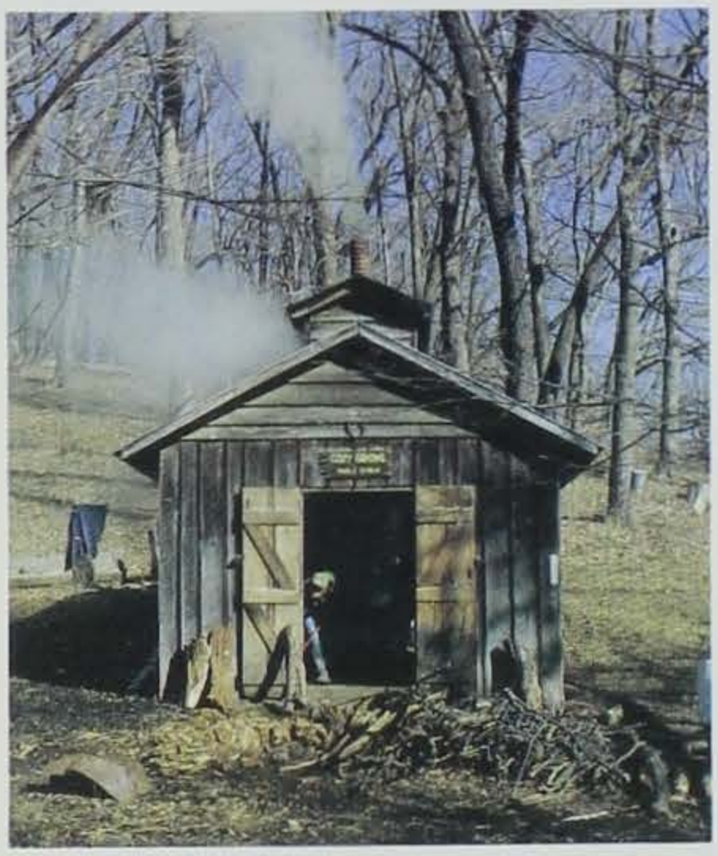
WENDY ZOHRER

favorite sayings, epitaphs and markings will serve as a reminder of their brief visit to the past.

This is just one of the many exciting conservation and environmental education programs offered by more than half the county conservation boards across the state. Contact your county conservation board for information about school programs and public programs designed to help you learn more about the natural and cultural heritage of Iowa.

Cele Burnett is a naturalist with the Story County Conservation Board.

Spinning Sap Into Syrup



Text and Photos by Deb Coates

ABOUT ONE MILE SOUTH OF ALGONA, DEEP IN THE WOODS, THERE STANDS A shack — *Cozy Grove* they call it. Here six men "spin" sap into syrup. Each year, Ed Mino, Chuck Benson, Robert Deal, Don Jorgenson, Kevin Benson and John Simpson put in long, hard hours to make the deliciously sweet syrup.

Cozy Grove is a very unique place. The men started the operation in 1947. Since then, many school children have had the pleasure of experiencing the art of making maple syrup. Inside the shack, the walls are "papered" with the outlines of hands. Inside each outline is the person's name and the date when they had this "hands on" experience.

For these six men, making maple syrup is a year-round hobby. During the summer and fall months, they cut wood to burn in their furnace. It takes a lot of wood to keep the furnace going 24 hours a day for about four weeks.

Approximately 150 maple trees are tapped in early spring, when warm days following cold nights cause the sap to rise. Spouts or spigots are driven into holes bored two inches deep into the lower trunk, and nearly 200 metal buckets are hung on the spouts to catch the sap. Maple sap has a distinct sweet flavor, with up to three percent of its content being solids, particularly sucrose.

The sap is collected once in the morning and once in the late afternoon and filtered into two big tanks behind the shack. On a good warm day when the sap is running at its highest, 150 to 175 gallons may be collected in one afternoon. From these tanks, the sap goes by gravity flow through a hose which is connected to the long evaporating pan. The flow of sap from the tanks into the long evaporating pan is regulated by a float. When the float lowers to a certain point, it automatically releases more sap.

The long evaporating pan is divided into three long troughs and sits on top of a long furnace. As the sap boils, it systematically flows through each trough without the help of gravity. The sap starts to darken as it very slowly flows from one trough to the next. At the end of the third trough, there is a tap where the partially finished product is drawn and transferred to a pan sitting at the head of the furnace. This boiling sap is watched very carefully and checked with a thermometer as it quickly darkens. Hundreds of gallons of sap are boiled down to the desired consistency, color and flavor. At Cozy Grove, they boil the sap until it reaches 218 degrees Fahrenheit. It is now that the men must pour the syrup through a filter into a keg and fill bottles from the tap before the syrup cools. The syrup is usually bottled at a temperature of 212 degrees Fahrenheit.

Generally, it takes from 30 to 40 gallons of sap, depending on soil, weather and other conditions, to produce one gallon of syrup. Cozy Grove Maple Syrup is not marketed commercially. According to the men their small industry is for personal enjoyment only. Syrup that the men do not use themselves is given to friends.

The production of maple syrup has vastly improved over the years. The early Massachusetts colonists found the Indians making a kind of maple syrup which served as their principal sweet. Their methods of collecting the sap were described by settlers as early as 1663. The Indians cut a gash in the maple trunk and, with a hollow reed inserted into the cut, directed the sap into a small container, which, when filled, was emptied into a larger bark container or hollowed-out section of log. The sap was evaporated by dropping hot stones into the large container until the water had boiled away.

The colonists' early methods were

crude, and the product was dark in color and smoky to the taste. Moreover, tapping trees with an axe tended to denude the forests of maples. The sap was caught in troughs hewn from logs, then carried in pails to the boiling place, and reduced to syrup in potash kettles over a blazing open fire. The kettles usually were suspended by chains from a horizontal pole supported by forked or crossed sticks at each end. Wooden spouts and buckets gave way to galvanized metal ones. Log troughs gave way to collection tanks and the primitive row of kettles over an open fire was replaced by the large modern evaporator.

Making maple syrup has been an American tradition for many years, whether it be for commercial use or for personal enjoyment only. Try making your own maple syrup. It can be a fun, educational and tasty experience. And, of course, it is one way to enjoy one of Mother Nature's "sweet" pleasures.

Deb Coates is the park ranger at Pilot Knob State Park.

Boiled sap is poured through a filter into a keg (above), and before the sap cools, the syrup is bottled (left).

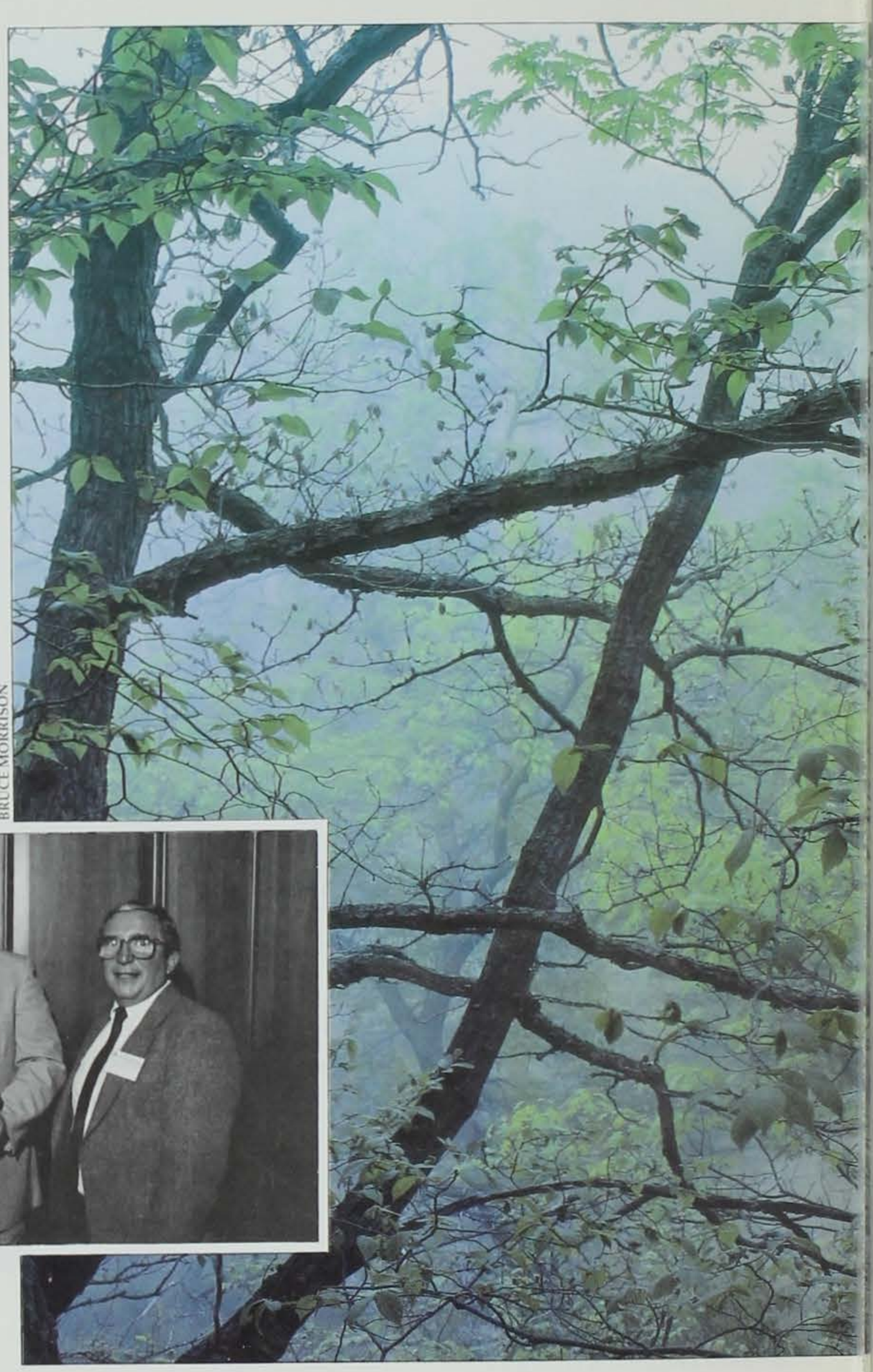
Woodland Owner of the Year
Bob Chandler

by Stan Tate

BOB CHANDLER OWNS A 100-ACRE TREE FARM IN THE NORTHERN PORTION of Lee County, Iowa. He has had a long-term interest in forestry, but began a serious forest management program in 1977 when he built 180 rods of fence to protect his forest land from grazing. He realized this was the first step to improving the quality and the value of his woodlands. The construction of this fence also provided protection to several hundred additional acres of forests owned by his neighbors.

Chandler began working closely with his district forester, and in 1977 they worked together to develop Chandler's first forest management plan. Soon after, Chandler applied for and received forest reserve status from the county assessor's office.

Chandler had the forester do a detailed inventory of his forest land in 1982. The inventory accounted the species, size, volume, growth rates and relative crowding of the forest.



BRUCE MORRISON

Mr. and Mrs. Bob Chandler receive the 1987 Iowa Woodland Owner of the Year Award from Forestry Division administrator Bill Farris.

The data made it possible for him to make a better assessment of the present conditions of the forest and was useful in long-range planning.

An analysis of the data indicated that a timber stand improvement project was needed and financially feasible. The project had two primary purposes.

The first was to remove wolf and weed trees. Wolf trees are large trees of very low value which occupy too much growing space. Weed trees are undersireable trees which need to be removed so that they do not continue seeding more of their own. Honeylocust was one of the primary culprits in Chandler's timber. These extremely thorny trees invaded the forest in earlier times due to the influence of cattle grazing. Ironwood was another weed tree which had also invaded the area.

The second aspect to be accomplished in the forest improvement project, called crop tree release, involved identifying the best 100 trees on each acre, making sure each of the trees were pruned and had room to grow. If there were low value trees crowding a crop tree, they were killed by the injection of a minute amount of herbicide.

Chandler hired a consulting forester to do the actual improvement work. The consultant brought in a small crew and had completed the entire 100-acre job by November 1982. Growing high quality timber is an excellent investment and is very competitive with other land uses. Making these investments makes sound financial sense.

All the hearty young walnut trees (over 800 trees) had been located, pruned and the vines cut off. These valuable young trees now had plenty of room to grow, had nice clean stems and would not be strangled by vine growth.

The forester submitted an application to the American Forest Institute, asking that Chandler's land be certified as an official Tree Farm and several months later certification was received. Membership in the Tree Farm System is one way that the forest industry honors landowners who are taking an active approach to good forest management.

Chandler also underplanted a five-acre area that had been identified on soil maps as being very productive for black walnut. Walnut, ash and oak were planted under the cover of poor quality black oak trees. These poor quality trees were later harvested to allow the planted seedlings more light and growing space.

In 1983 Chandler requested that the forester mark the mature white oak that was ready for harvest. The forester marked and scaled about 14 thousand board feet of logs. The trees were harvested in 1984.

Also in 1983 Chandler began raising Christmas trees as an alternative farm crop. He has been planting an acre or two each year, primarily Scotch pine and white pine. He plans to eventually establish about 15 acres of commercial Christmas tree production, to help supplement and diversify his farm income.

Chandler and his family certainly seem to take great satisfaction and pleasure in their tree farm. Bob is an avid deer hunter and knows that an active forest management program really improves the quality of the wildlife habitat. "The whole family enjoys the timber," Chandler said, "I cut a trail just for the family to take Sunday walks. We really enjoy watching our trees grow. The pine have sure done nicely. The timber stand improvement project sure looks great now, especially all of our young walnut trees."

Aulden Van Winkle owns the timber that sits next to the Chandler timber. Together, they take pride in knowing that they own the largest block of well-managed forest in that part of their county. They have worked together on fence construction and forest management projects that have benefited them both.

Chandler doesn't hesitate to state his philosophy to other landowners across Iowa. "I think that we have to look to the future, because we are the ones that have to look out for the next generation."

Stan Tate is a district forester located at Wapello.

IWOA

IOWA WOODLAND OWNERS ASSOCIATION

by Dan Fogle

I.W.O.A. No, it is not "Iowa" misspelled but an abbreviation for a new statewide organization — the Iowa Woodland Owners Association. After decades of declining woodland acres in Iowa, concerned woodland owners have come together to try to reverse the trend.

Iowa's timber resources are vastly under utilized and mismanaged. This new organization will address these problems directly with assistance from its members and educational programs promoting Iowa's woodlands.

The timing seems right for this group as challenging times lay ahead. New government programs are helping to relieve dependence on traditional resources in Iowa. Nothing will replace grain crops as the mainstays but there is plenty of room for diversity, and Iowa's woodlands can fill a large part of it. Locating viable markets for less-desirable species and helping upgrade current resources are just two areas the I.W.O.A. intends to work on.

The association currently has over 250 members. Not all members are woodland owners, and anyone interested in Iowa's forest resources is encouraged to join.

The association held its first meeting in October 1987 at the State Forest Nursery in Ames where the association was incorporated as a nonprofit organization. A set of by-laws was adopted and a board of directors was elected at the initial meeting.

With the help of dedicated individuals, generations to come will enjoy a legacy left to them by farsighted people who are concerned about the future. Interested groups or individuals can contact an I.W.O.A. board member, the Forestry Extension or a DNR forester for informational pamphlets and applications.

Don Fogle is a member of the Iowa Woodland Owners Association.

CONSERVATION UPDATE

CHANGES IN STATE FISHING LAWS

The Iowa Department of Natural Resources has made several changes in the 1988 sport fishing regulations.

- Anglers must comply with the most restrictive set of regulations applicable to the water on which they are fishing. Where length limits apply, fish less than the legal length must be immediately released into the water from which they were caught.
- All black bass caught from the Maquoketa River, Delaware County, extending from below Lake Delhi Dam as posted to the first county gravel road bridge must be immediately released alive.
- The statewide 15-inch minimum length limit on black bass in public lakes is continued except where otherwise posted. On federal flood control reservoirs, a 15-inch minimum length limit shall apply on black bass at Coralville and Rathbun and a 12-inch minimum length limit shall apply at Saylorville and Red Rock.
- The possession limit for catfish is 30 from interior lakes and streams.

Anglers are also reminded that a valid sport fishing license entitles a person to take and possess a maximum of 100 pounds of live turtles or 50 pounds of dressed turtles. The sale of live or dressed turtles is not permitted with a sport fishing license.

Complete rules and regulations regarding sport fishing are included in the 1988 Fishing Regulations.

TITLES REQUIRED ON NEW BOATS

All new boats that are 17 feet or longer are required to be titled as well as registered with the state of Iowa. Canoes and inflatables are exempt from this requirement.

Purchasers should obtain a manufacturer's certificate of origin from the dealer. The certificate should be properly completed and should include the coast guard's or manufacturer's assigned capacity in whole persons. The certificate must be surrendered to the county recorder upon titling of the boat.

Boats 17 feet or longer that are registered in Iowa prior to Jan. 1, 1988, will not have to be titled until it is sold or traded. At that time, the seller must obtain a title in the seller's name and complete the back of the title showing sale or trade to the buyer. The current registration certificate signed over to the buyer as well as the signed-over title will be used by the buyer to obtain title and registration in the buyer's name.

Each moment of the year has its own beauty...a picture which was never seen before and which shall never be seen again.

— Ralph Waldo Emerson

Frances Brady (center) retired Nov. 19 after 37 years of employment with the Conservation Commission and Department of Natural Resources. Frances had been the secretary for the past six directors, including the DNR's current director, Larry J. Wilson (left). Frances was honored by Governor Terry Branstad (right) in a ceremony in the Governor's office.

DONATIONS

Doug McCreedy Cedar Rapids	10 wood duck houses valued at $200 for wildlife management at Pleasant Creek State Recreation Area
Allerton Lions Club Allerton	$300 for fishing jetty construction at Bobwhite State Park
Allerton World Booster Club Allerton	$200 for fishing jetty construction at Bobwhite State Park
Chariton Lions Club Chariton	Grill valued at $200 for stone shelter at Red Haw State Park
Mr. and Mrs. Gary Refer Villisca	Three playground seats valued at $150 for playground equipment construction at Viking Lake State Park
Steve Kautzky Perry	Air hammer valued at $65 for Lake Ahquabi State Park
John Lawyer Indianola	Labor valued at $125 for vehicle repair at Lake Ahquabi State Park

FLIGHT SPEED OF DUCKS

The speed of a duck's flight depends on two factors: its ability to fly through the air by its own exertions, and the helping or hindering influence of the wind. For most ducks, ordinary flight is around 40 to 60 miles per hour plus an additional 13 miles per hour when chased. Contrary to popular opinion, bluebills fly as fast as teal, and Canada geese can fly faster than mallards and pintails.

Canvasback, when chased, have been timed at 70 miles per hour. A badly frightened canvasback with a 30 miles per hour tail wind is capable of reaching 100 miles per hour ground speed.

LANDFILL GAS TO GENERATE ELECTRICITY

Landfills are more than just a place to dump garbage; they can also be a source for electricity generation. The Des Moines Metropolitan Area Solid Waste Agency has installed six wells and plans to extract landfill methane gas and convert it into electricity. The goal is to provide an inexpensive source of electrical energy, fulfill the landfill's electricity needs, and safely remove the noxious and explosive gas from the landfill.

This is an important Iowa project because the natural processes of waste decomposition include the generation of waste gasses — in particular, methane gas. This situation is particularly evident in landfills where municipal, commercial and industrial solid wastes are concentrated and compacted. Gas generation will continue for years, even after the site is no longer in use. During this entire time, the gas may present a significant health and safety problem due to it noxious and explosive nature.

Some of the early landfills experienced a lateral migration of methane gas from these sites. It collected in low spots such as nearby building basements which then resulted in a potential explosion. Many landfills located near buildings have been forced to develop elaborate gas collection and venting systems. The gas is collected and either burned or otherwise vented into the atmosphere. However, if the quality and quantity of the gas produced meets certain criteria, it could become a potential energy source.

In California and in other large metropolitan areas where large landfills and dense population centers exist, this landfill gas has been mined and pumped through large gas turbine generators. Two to five megawatt per hour units produce electricity and assist in supplying the municipal networks.

In Iowa, landfill gas projects have been ignored primarily because they do not have enough gas available to support such large units. The Des Moines Metropolitan Solid Waste Agency, which owns Iowa's largest landfill, determined that a smaller and more flexible generating unit was needed to utilize the smaller amounts of gas. These smaller units can provide a great deal of flexibility because they can be combined with other similar units to utilize more of the landfill gas potential and be easily transported around the landfill site when the gas is depleted in a given area. The 100-125 kilowatt per hour range unit selected by the agency is capable of providing sufficient power for both present and future landfill needs.

The agency had originally planned to sell any excess electrical energy to the local utility. However, the utility is able to purchase large amounts of inexpensive electricity from other sources. This fact, coupled with the added expense of constructing poles and wires from the utility lines to the site of generation, the agency decided to retain the electrical energy for its own consumption. In particular, the agency would like to power a leachate collection and treatment system.

Test wells at the landfill have found methane concentrations ranging from 31 to 71 percent, with an average of approximately 58 percent. The combustible content of this landfill gas averages 500 Btu's per cubic foot, compared to 1000 Btu's per cubic foot for natural gas and 100 Btu's per cubic foot for typical landfills gas projects. Refuse over ten years old or less than one year old does not contribute significantly to the total gas supply.

The Des Moines landfill receives approximately 350,000 tons of refuse per year. An engineering firm hired by the agency estimates that the landfill has the potential to produce 1100 cubic feet of methane gas per minute. The rate of methane recovery should remain constant as long as the site remains open and the annual volume of refuse does not significantly change.

Existing or closed Iowa landfills could benefit from this demonstration project. The development of this smaller scale system could be a model for the utilization of landfill methane gas in the production of electricity.

CALENDAR

February Weekends	Cross-Country Skiing Lessons (Weather Permitting) Hamilton County (515)832-1994
Feb. 6	Heritage Day 9:30 a.m.-3:30 p.m. Black Hawk County Hartman Reserve Nature Center (319)277-2187
Feb. 6	Ice Fishing Workshop Clinton County Killdeer Rec. Area (319)847-7202
Feb. 7	Winter Fun Day 1-4 p.m. Carroll County Swan Lake State Park (712)792-4614
Feb. 7	Cross-Country Skiing 1 p.m. Jackson County Big Mill Wildlife Area (319)652-3783
Feb. 13	Seasons of Palo Alto County-Hike 1-3 p.m. Palo Alto County Lost Island Marsh (712)837-4866
Feb. 14	House Concert Lauren Pelon Clinton County Eagle Point Nature Barn (319)847-7202
Feb. 14	Owl Calling 7 p.m. Jackson County Historical Museum (319)652-3783
Feb. 15	Conservation Film 7 p.m. Palo Alto County Iowa Lakes Community College Emmetsburg (712)837-4866
Feb. 21	Cross-Country Skiing Jackson County Ozark Wildlife Area (319)652-3783
Feb. 21	Bluebird Workshop Carroll County Swan Lake State Park (712)792-4614
Feb. 21	Eagle Watching 7 a.m. - 6 p.m. Black Hawk County Hartman Reserve Nature Center (319)277-2187
Feb. 21	Cross-Country Ski Seminar Benton County Rodgers Park (319)472-4942

SOUNDING TAPS FOR THE SUGAR MAPLE

For generations, rural New Englanders have produced and enjoyed the fruit of the maple tree — maple syrup by the gallon. But now, according to an article in *National Wildlife* magazine, a mysterious plague has killed thousands of trees in Canada

and has begun to creep into New England's North Country. Virtually everyone involved, including scientists, suspects that air pollution is playing a major role.

To date, only scattered stands of sugar maples in the United States have died, most of them near the Canadian border or at high elevations, where environmental stresses are greater. Yet in a development that scientists say might not even be related, the flow of maple sap is slowing all across New England. "Sugar production was down in 1986 and down even more drastically in 1987," says Wilson Clark, president of the Vermont Maple Sugar Makers Association. This year's production in Vermont is estimated to be about 250,000 gallons, Clark says, "one of the lowest of the century."

In Canada, whole forests are succumbing to a mysterious plague. In 1986, an aerial survey showed that 82 percent of the trees in one area of Quebec were dead or dying. Many sugar producers have been wiped out.

In addition, the sugar maple is just one of numerous afflicted tree species. Scientists have found that entire sections of forest from North Carolina to Maine are affected.

Many causes for the declining forest have been suggested, from insect infestations to changes in climate. Most scientists suspect, however, that air pollution is involved. "Certainly pollution is another source of stress for the trees," says botanist Mariafranca Morselli of the University of Vermont's Maple Research Laboratory. "It may be accelerating many of the effects we are seeing."

Scientists have shown that acid rain seriously affects leaves and significantly changes the mineral composition of soils. Sulfur dioxide, a precursor of acid rain, can cause declines in tree growth even when found at low levels in the atmosphere. Another air pollutant, ozone, has been linked to tree dyings. And heavy metals such as arsenic, antimony and selenium, which can be transported hundreds of miles through the air, appear to harm microbes in the forest soil, slowing the crucial breakdown of debris into nutrients.

For many foresters and sugar producers, the link between air pollution and dying trees is clear enough to warrant immediate action. Several European countries and Canada are cracking down on air pollution in an effort to halt the decline of their forests. The United States, however, has shown little willingness to tackle the problem.

ENERGY CONSERVATION COULD REDUCE ACID RAIN

An energy conservation contribution to reduce the amount of acid rain has been quantified in a newly released study "Acid Rain and Electricity Conservation" by the American Council for an Energy Efficient Economy. The study finds that in the industrial midwest where sulfur dioxide emissions are high; the costs of installing sulfur dioxide scrubbing facilities could be more than offset by the reduced costs associated with a simultaneous and aggressive energy conservation program.

"The acid rain issue provides the motivation and opportunity for states and utilities to aggressively pursue electricity conservation in regions where there is a heavy reliance on high sulfur coal," states Howard Geller, principal author of the report. "By planning and managing electricity demand, electricity supply and emissions control in an integrated manner, states and utilities can both protect the environment and protect the economic interest of their consumers."

The study focused on an area which includes Ohio, Michigan, Indiana, Kentucky, West Virginia and portions of Maryland and Pennsylvania. The region is heavily dependent on high sulfur coal and is a heavy contributor to sulfur dioxide build-up. While the region's electric utilities produce about 17 percent of the nation's electricity, they also emit one-third of utility generated sulfur dioxide.

The study looked at 65 conservation measures covering all major end-use categories in the industrial, commercial and residential sectors. According to Geller's analysis, "Effective conservation potential in the region is 92,000 gigawatt hours per year or 26 percent of current regional electricity use."

SPRING TURKEY APPLICATIONS AVAILABLE

Applications for spring turkey hunting must be in the Iowa Department of Natural Resources' Des Moines office by 4:30 p.m., Feb. 14, or be postmarked by that date. License applications can be obtained from most places selling hunting licenses, county recorder offices, conservation officers, DNR district offices, or the DNR central office, Wallace State Office Building, Des Moines, Iowa 50319-0034.

Two types of paid licenses are available. Combination gun/bow licenses are valid only in the zone and season for which they are issued. Bow-only licenses are valid for all zones in all seasons. The fee for both types is $20. Landowners or their tenants may obtain a free gun/bow or bow-only license valid only on their lands with a limit of one per farm.

The season dates for combination gun/bow licenses are Apr. 11-14, 15-19, 20-26 and Apr. 27-May 8. For the first three seasons, the number of licenses issued per zone are:

Zone 1 - 1750 licenses per period
Zone 2 - 335 licenses per period
Zone 3 - 160 licenses per period
Zone 4 - 700 licenses per period
Zone 5 - 800 licenses per period
Zone 6 - 40 licenses per period
Zone 7 - 80 licenses per period
Zone 8 - 20 licenses per period
Zone 9 - No Zone 9
Zone 10 - 125 licenses per period
Zone 11 - 65 licenses per period
Zone 12 - 125 licenses per period

For season four, Apr. 27-May 8, an unlimited number of licenses will be issued in all zones except zones 7, 11 and 12 (state forests). In zones 7, 11 and 12, the quota will be the same as for the other three seasons. In all other zones, all eligible applicants for the fourth season will receive a license.

The deadline for applying for a paid combination gun/bow license is Feb. 14 with a possible reopening if some quotas are not filled. The reopening date will be announced after the first drawing is completed.

Applications for bow-only licenses will also be accepted through the end of the season (May 8). Applicants can have only one bow-only license and cannot apply for any other spring turkey license.

Complete information on hunting zones and periods is included on the application. There will be no refund or exchange on licenses issued.

CLASSROOM CORNER

by Robert P. Rye

Few people are aware of the many ways wild animals secure their food. Test your knowledge with the following questions about food gathering by animals.

QUESTIONS	ANSWERS
1. What animal secures food by wrapping itself about its prey and strangling it?	Hummingbird
	Opossum
2. What animal secures food by cutting off plant material with its sidewise-working mandibles?	Grasshopper
	Snail
3. What animal secures food by caching away surplus food in summer and consuming it in winter?	Toad
	White-tailed Deer
4. What animal secures food by hovering in the air while its long bill siphons the nectar from a flower?	Belted Kingfisher
	Blue Racer
5. What animal secures food by manufacturing silk and making nets to trap its prey?	Spider
	Squirrel
6. What animal secures food by diving head-long into water to capture fish?	
7. What animal prefers to scavenge carrion and garbage but uses the most abundant food available?	
8. What animal secures food by nipping off grass, browse, or domestic crops and passing it through several "stomachs" to digest it?	
9. What animal secures food by moving along on one foot with a radula?	
10. What animal secures its food by flipping out its tongue, which is attached in the front, and bringing insects into its mouth?	

Answers:

1. Blue Racer 2. Grasshopper 3. Squirrel
4. Hummingbird 5. Spider 6. Belted Kingfisher
7. Opossum 8. White-tailed Deer 9. Snail 10. Toad

Birds For The Boxes

DOUG REEVES

Black-Capped Chickadee

by Doug Reeves

DO THE MID-WINTER BLUES HAVE YOU DOWN? WHY NOT THINK SPRING AND BUILD A FEW NEST BOXES FOR YOUR feathered, summertime friends? There are at least 23 species of birds that will use nest boxes in Iowa, yet we usually only hear about the three most common types (eastern bluebird, house wren, wood duck). Rather than rehash things about the various attributes of differing styles of nest boxes, what I would like to do is give a little exposure to some species that many people overlook when they make nest boxes. Because increasing numbers of Iowans are joining what appears to be a nest box revival, it may be especially useful to treat some of the little-known species here.

Black-Capped Chickadee

Let's start with a favorite species — the black-capped chickadee. Most people who have several bluebird boxes already know that the chickadee is a cavity-nesting species (meaning it nests in hollows in trees) that will readily use nest boxes. Chickadees prefer woods or wooded field edges, so they do not really compete with bluebirds for nest sites. In fact, they will nest in typical yards so long as sparrows, house cats and raccoons are kept out of the nest. They like a nest box that is about the size of a bluebird box. An entrance hole of about 1-¼ to 1-½ inches suits chickadees just fine. The box should have a bottom at least four inches square and should be at least five inches deep below the entrance hole. The box can be placed about shoulder height although I have seen chickadee nests in dead stumps only two feet above the ground.

Chickadees make a nest of green moss taken from the base of trees and off the ground. They line the nest with hair. The eggs are small, have a basic white color and are speckled with reddish spots.

Baby chickadees are among the cutest of baby birds. Instead of having a very different juvenile plumage, they look very similar to the adults. Furthermore, chickadee broods are large. Finding seven or eight babies in a nest is not unusual. I once observed a pair of adult chickadees near a nest for over an hour. On the average, every three minutes one of the parents came to the nest with a green worm in its mouth for the youngsters (seven of them) in the nest. Imagine how many worms that family of chickadees ate by the time the youngsters left the nest! Chickadees generally nest only once during the year, and they start nesting quite early, so it is often possible to have a box occupied by chickadees and later occupied by a family of house wrens.

Great-Crested Flycatcher

This summer, a person contacted me to explain about a problem that she had keeping a certain kind of bird out of her bluebird boxes. After discussing the size, color and voice of the birds as well as the color and size of their eggs, I realized that the person had at least two pairs of great-

DOUG REEVES

Great-Crested Flycatcher

crested flycatchers trying to nest in the boxes. I was sorry to learn that the nests and eggs of the birds had been thrown out on four different occasions over the last two years.

The great-crested flycatcher is a native, desirable and special songbird that deserves to use our nest boxes as much as any other species. These birds like wooded areas, particularly wooded edges, and they require a box opening of about 1-¾ inches. The box should probably be at least five inches square on the bottom and should have a depth of seven to eight inches below the entrance hole.

Great-crested flycatchers nest throughout Iowa and prefer a fairly high nest box. Although I have seen them nest as low as four feet off the ground, most published accounts indicate that the box should be eight feet or higher. These flycatchers lay four to five eggs that are a basic white to cream in color with extensive red-brown markings. The birds have an unusual habit of lining the nest with a shed snakeskin, plastic wrapper or other similar material. Very few people have placed nest boxes out for this species, but those who have successfully attracted them truly enjoy them.

White-Breasted Nuthatch

The "upside down bird" that gives us so much enjoyment when we see it walking down trees is also a cavity-nesting bird. Although I have had eight desirable species of birds nest in boxes that I placed out for them over the years, this species still eludes me. In fact, one of my goals next spring is to get a pair of white-breasted nuthatches to nest in one of my boxes.

According to published information, nuthatches require an entry hole of 1-⅜ inches. Some reports say these birds will nest four feet above the ground. Others claim the boxes should be at least 10 feet high. The only actual nuthatch nest I ever saw was about 18 feet high in a dead limb. Perhaps my boxes have not been high enough to attract these birds.

Nuthatches prefer wooded areas to nest in and lay large clutches of seven to nine eggs. The eggs are basically white with light red-brown spots. A little sawdust (one-half to one inch) in the bottom of the box is reported to help attract nuthatches and chickadees. White-breasted nuthatches nest throughout Iowa.

Prothonotary Warbler

One of the prettiest birds that will nest in a box in Iowa is the beautiful yellow prothonotary warbler. A bird of the river bottom floodplain, it nests mostly along the Mississippi and lower Des Moines Rivers plus around the Rathbun Reservoir. Anywhere near water in eastern or southeastern Iowa would be worth a try for attracting this species. A pair of hip waders, a canoe or a boat will almost be a must if you hope to attract this bird since it likes nest boxes that are placed about four feet above standing shallow water. Although its distribution is somewhat restricted in the state and the placement plus monitoring of the boxes may be difficult, the reward of seeing a bird that is rarely seen by most Iowans is worth the effort required. One individual from eastern Iowa reported four

Wood Duck DAVE MENKE

Below is a list of bird species that could be expected to use nest boxes in Iowa.

Ducks:
- Wood duck
- Hooded merganser

Falcons:
- American kestrel

Doves:
- Rock dove (pigeon)

Owls:
- Common barn owl
- Eastern screech owl
- Barred owl

Woodpeckers:
- Red-headed woodpecker
- Downy woodpecker
- Hairy woodpecker
- Northern flicker
- Red-bellied woodpecker

Swallows:
- Purple martin
- Tree swallow

Flycatchers:
- Great-crested flycatcher

Chickadees:
- Black-capped chickadee
- Tufted titmouse

Nuthatches:
- White-breasted nuthatch

Wrens:
- Carolina wren
- House wren

Thrushes:
- Eastern bluebird

Starlings:
- European starling

Warblers:
- Prothonotary warbler

Weaver finches:
- House sparrow

Besides the three most common nest box users in Iowa — eastern bluebird, house wren, wood duck — at least 23 species of birds will use nest boxes in Iowa.

nests of prothonotary warblers in his boxes last summer. As far as I know, he is the only Iowan to have multiple nests of the species in Iowa nest boxes.

Prothonotary warblers require a nest box entry hole of 1-¼ inches. The box should be four by four inches or four by five inches and five to six inches deep below the entrance. The birds lay four to five eggs per clutch. The eggs are cream in color with brownish spots. You will have attracted a unique bird if you get these warblers to use a nest box. Other birders will envy your success.

Tree Swallow

One final species that should not be overlooked is the tree swallow. A bird of open spaces, especially near water, the tree swallow is an insect catcher extraordinaire and deserves a welcome to our nest boxes. In some areas, tree swallows do use nest boxes that might otherwise be used by bluebirds, but they are equally desirable as guests.

RON JOHNSON

RON JOHNSON

Tree swallow nests are unlike those of any other species. The bottom of their nest looks very similar to a bluebird's, made mostly of dead grass stems. But on top, tree swallows cover the eggs with feathers. It seems that the brighter the feathers, the better the swallows like them because white feathers often dominate. I have seen some beautiful swallow nests lined with the vermiculated side feathers of mallard drakes and the even more beautiful side feathers of male wood ducks. Sometimes near a farm, the feathers give the nest a really exotic look. I once had a tree swallow nest containing guinea, peacock and turkey feathers!
The spotless white eggs have an almost see-through quality and are quite delicate. You won't mistake a tree swallow nest. And you won't forget the first one you see.

Tree swallows nest mostly in the northern half of Iowa, but they seem to be moving southward. Any good bluebird box will work for swallows, too. Be sure to roughen up the inside of the box below the 1-½-inch entrance hole. My experience indicates that tree swallows have difficulty exiting any nest box that has a smooth interior.

That covers a few species that are of special interest here in Iowa. Enjoy your nest box building, and remember to keep the house sparrows and starlings out of the boxes.

Doug Reeves is a nongame wildlife biologist stationed at Boone.

Tree Swallows

WARDEN'S DIARY

Text and Photo by Jerry Hoilien

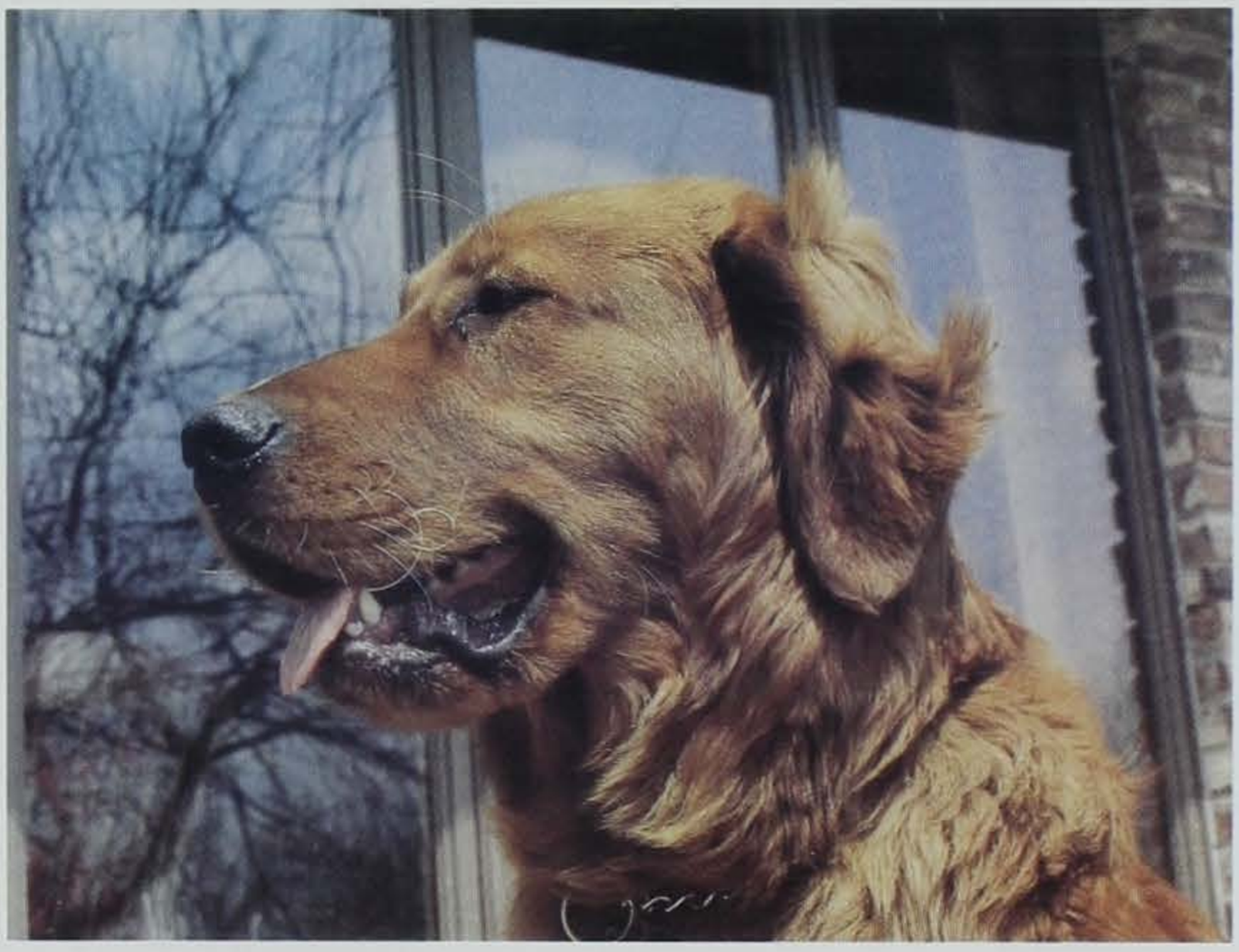
Darn, it's cold! I was walking the dike a few years back along the Mississippi River in the Green Bay Bottoms. Bum, my ol' golden retriever (grandfather of my present Bum, who is curled at my feet) was plowing snow just off to my left. The air boat I was interested in was out on the river, gunning across the ice about a quarter-mile ahead of me. Just then, it came to a grinding stop next to an island in a deep cut. The two men got out with a chain saw and began chewing holes in the ice to run the fish nets below.

Commercial nets are legal in this area, but when I had checked one a few days before, it was chuck-full of game fish, mostly walleyes. With nets, only rough fish such as carp, buffalo and drum can be kept. Game fish such as northerns, walleyes, bass and crappies must immediately be returned to the water alive. However, standing way out on a foot and a half of river ice, a long way from any buildings and no people around, it is pretty tempting to hang on to those game fish — especially if there is a good price on the black market in town.

The two men pulled the net from the deep water under the ice and dumped its flailing contents onto the ice. They both went to their knees, stuffing fish into sacks and boxes.

I broke off a dead stick about the length of a shotgun and stuck it under my arm. There was absolutely no way to sneak up on this operation. No cover — only snow and a lot of ice between me and them. Trying to look like a hunter, I started up the levee in their direction with a long way to go. Bum took the hunt and started to quarter back and forth in front of me, looking for a rabbit.

The air boat was loaded, they started the motor, gunned it hard to break loose from the ice and moved to the next net a couple hundred yards north. Again, the chain saw buzzed and more fish were loaded. I soon forgot how cold it was as I hiked along, walking fast when their heads were turned and poking along



slow when they looked my way. They dismissed me for a harmless hunter with his dog, as they moved to their next net.

As I came abreast of them, they started to load the last of the fish. They were about 200 yards out on the ice. It was now or never! As I turned towards them and started out across the ice, one of them looked up. Their air boat motor was off, and the yell, "WARDEN!" came sharp and clear across the slick ice. Both men were pulling sacks and boxes as fast as they could, throwing everything wildly into the boat. It was a foot race, now. Once that motor started, it would all be over, and they would leave me standing in a gale of flying snow and ice. I was flat-out "picking 'em up and laying 'em down" as fast as I could. I had a long way to go yet, as they threw in their last sack and jumped in. The starter growled. My chest was hurting from the cold air rushing in and out. The starter growled again. The prop began to turn, and the motor kicked over. *Darn!*

Suddenly a big red blur went streaking past me. Stretched out on a dead run, Bum made for the boat. As the motor roared, Bum leaped, cleared the side of the boat, and landed unceremoniously right in the middle. *"My God, they'll take off with my dog!"* My mind was racing. Got another 30 yards to go. The operator turned, starred at the dog in amazement for a moment, and *shut the motor off!* I skidded and banged into the side of their boat shouting, "State conservation officer, I want to check your fish!" That was a wasted statement — they *knew* who I was and why I was there. Completely out of breath, I starred down into several hundred-pound sacks of walleyes and saugers.

I'll probably never be exactly sure what went on in the minds of those Illinois commercial fishermen that day, when that big red dog came piling into their boat. But there didn't seem to be much doubt in Bum's mind as he panted and banged his tail on their gunnel. If *I* wanted it, *he* was going to help me get it — *and he did!* It turned out to be one of the biggest retrieves he ever made.

Nice to have a partner like that, isn't it?